ELECTRICAL REVIEW

TECHNOLOGY DEPT.

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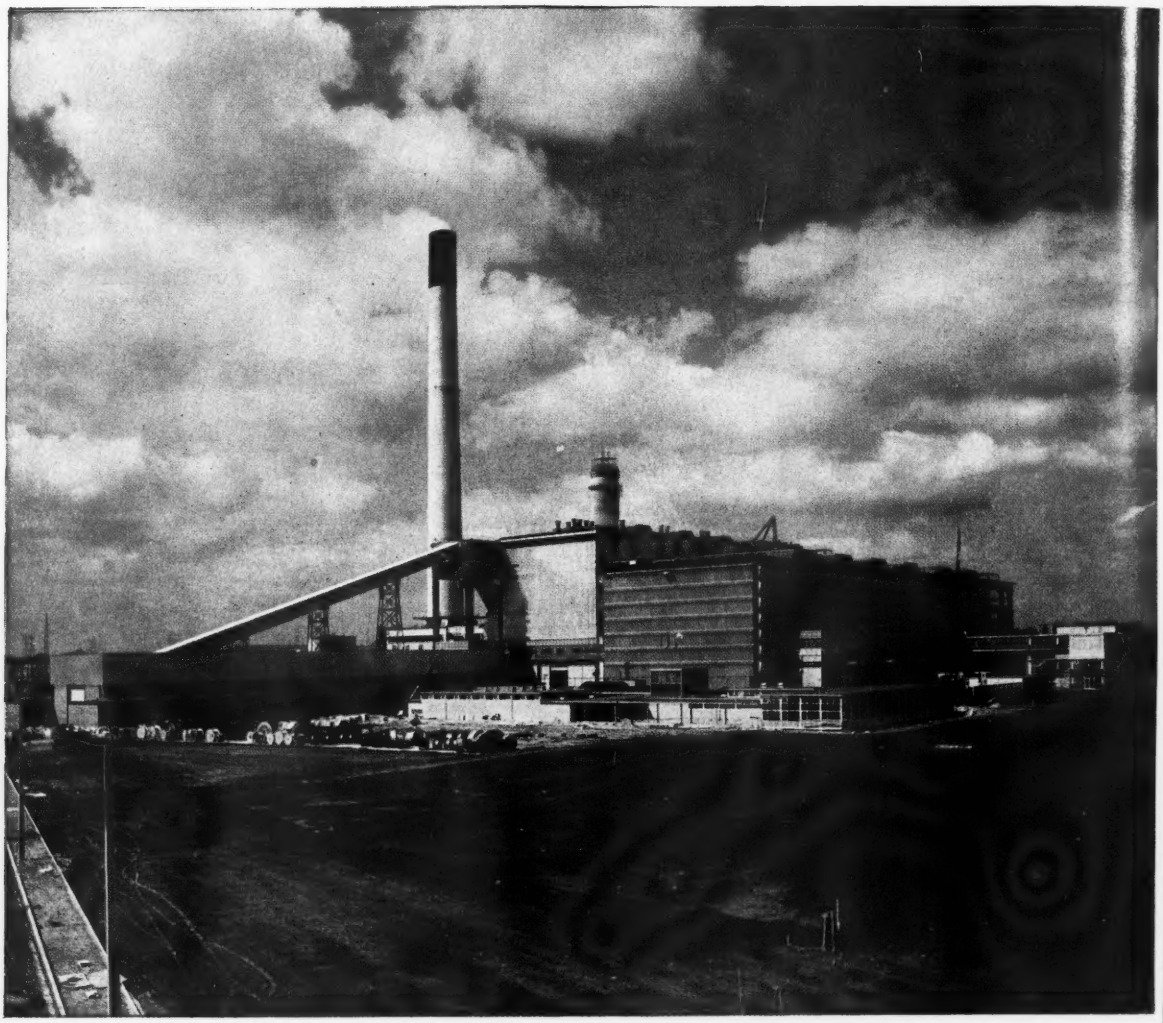

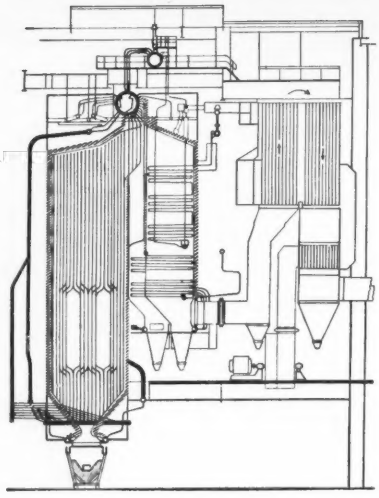

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Contributing to the C.E.A. new high record of capacity installed in a year are four of the projected eight 60,000 kW units of this impressive new generating station. The first set was commissioned 3¼ years from the commencement of site work and the other three within the next 12 months. John Thompson "Etaflo" water-tube boilers, each of 550,000 lb./hr. evaporation are employed. The station is fired either by oil or coal; auxiliary John Thompson La Mont boilers are installed for use with the oil fuel system. Coal is conveyed from waters-edge to station by John Thompson conveyors.

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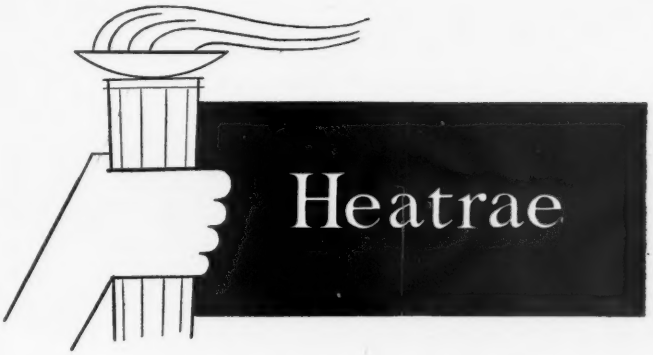

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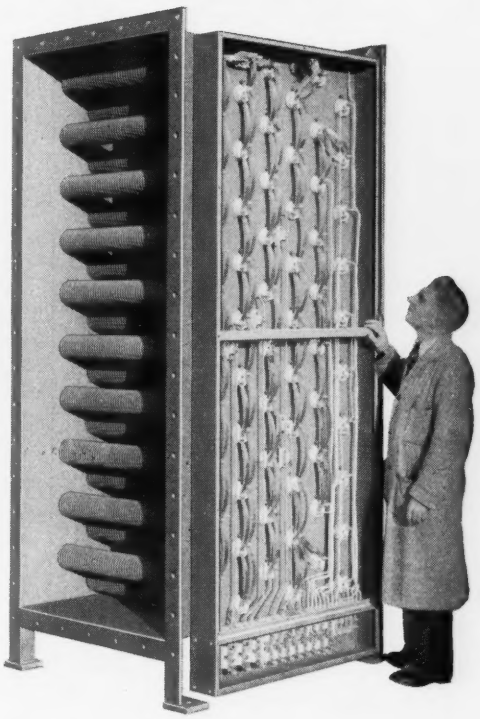
Illustration left is a typical example of a heater designed for inserting into vertical duct work. It is fitted with removable core heating elements.



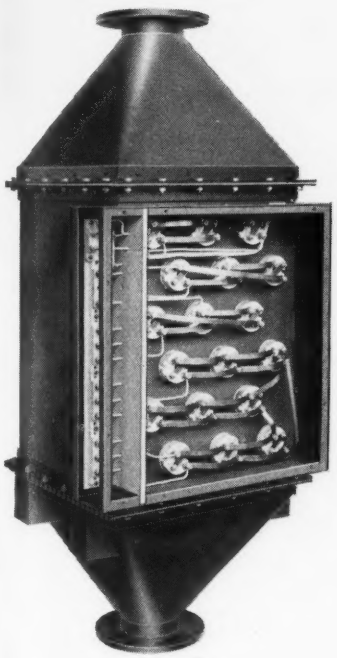


Illustration right is of a rectangular shaped air Heater for inserting into horizontal duct work.

These two types are intended for low air pressures, but Heatrae also make Drum Type Heaters suitable for high pressure working.
Full information on request.

In all Heatrae Air Heaters, the heating elements never come in contact with air. Elements are amply rated and arranged so that replacement can generally be made without interrupting the air flow.

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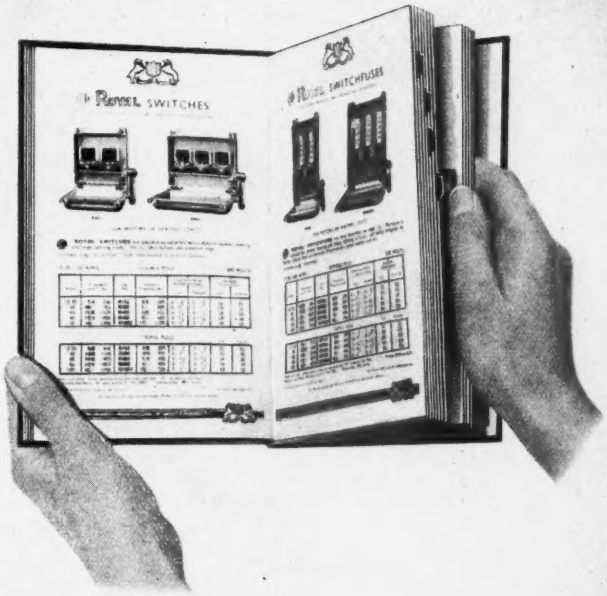

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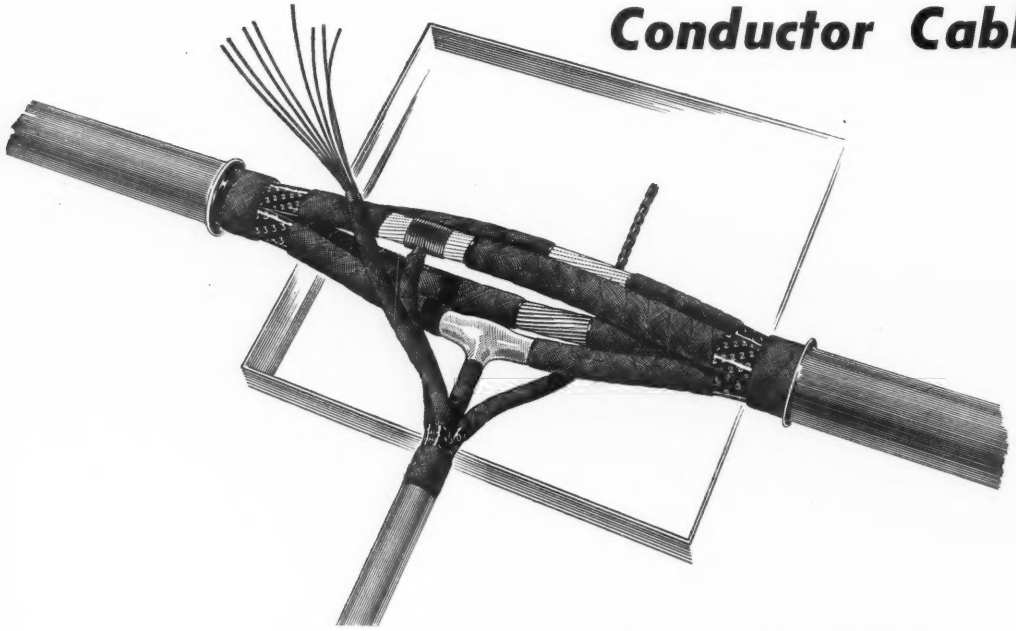

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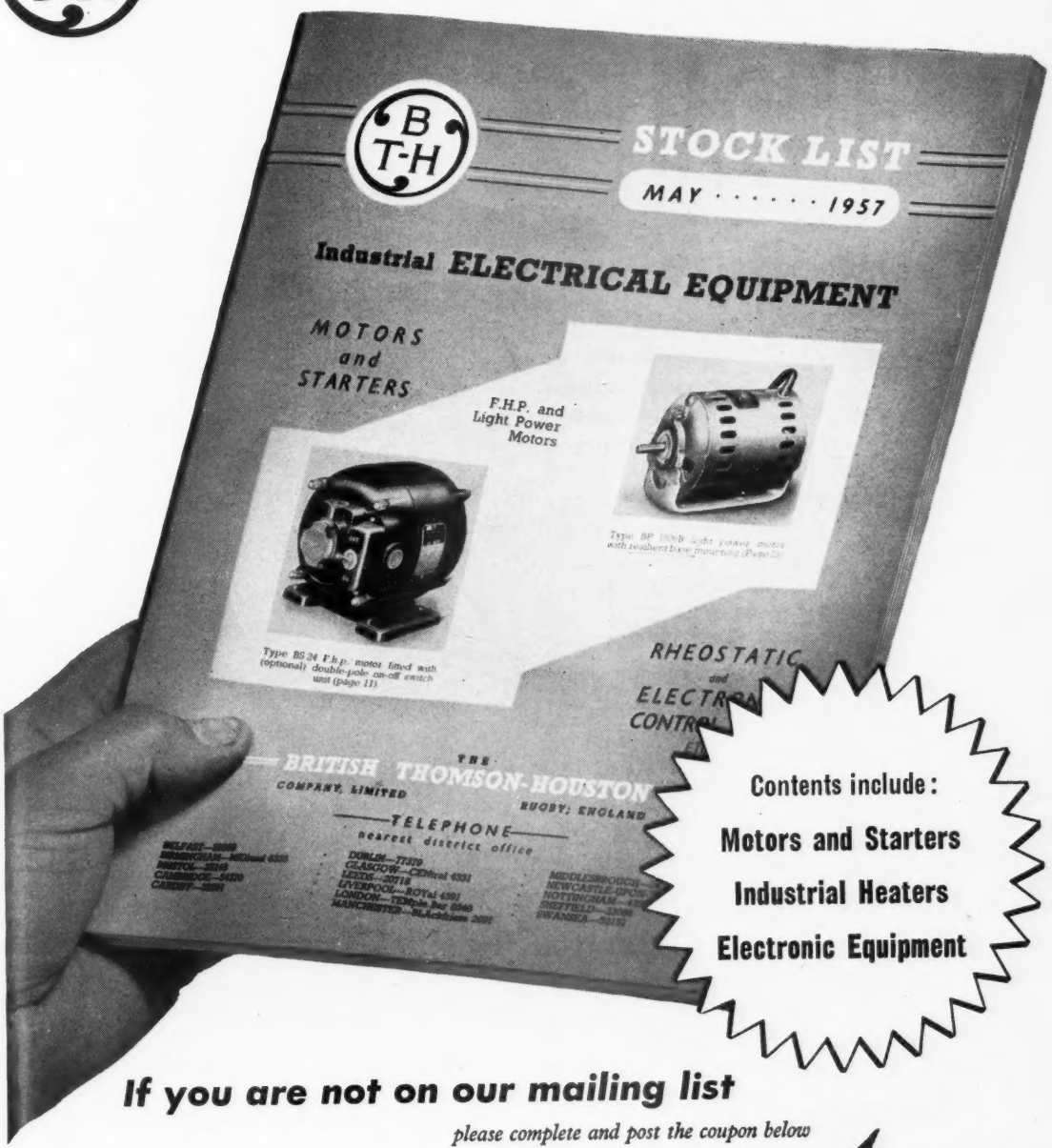

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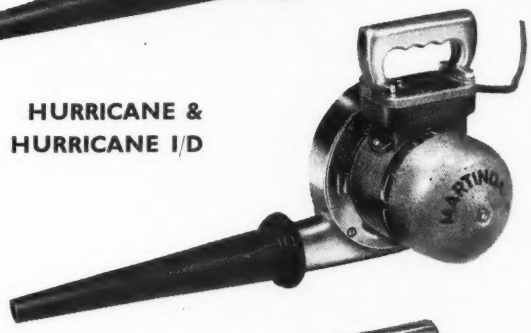
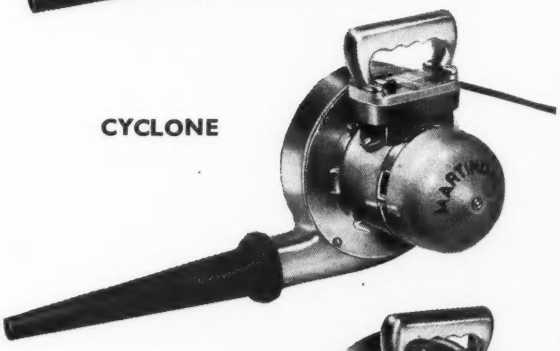


CYCLONE



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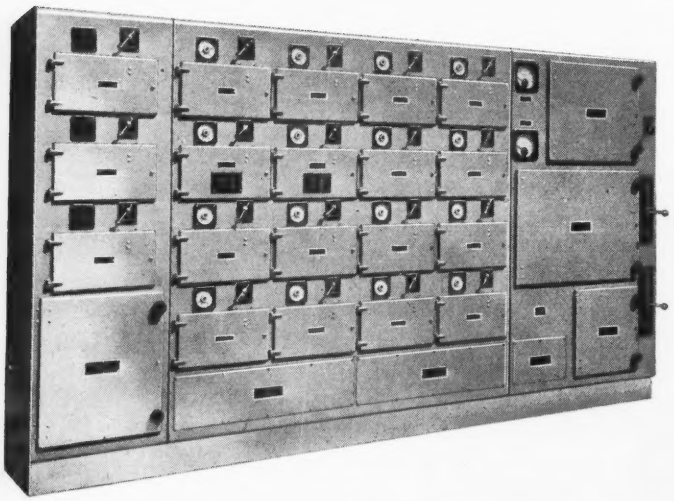
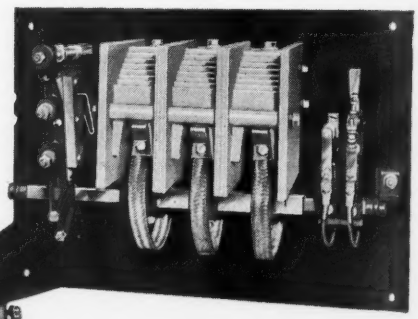
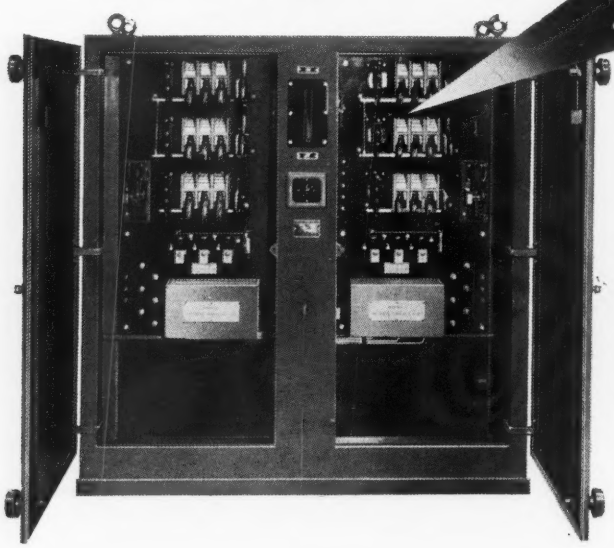


On the left illustrates a typical Multi-Motor Switchboard with busbar, fed individually isolated starter cubicles



Twin 35 h.p. Star-Delta Cubicle with Central Isolator



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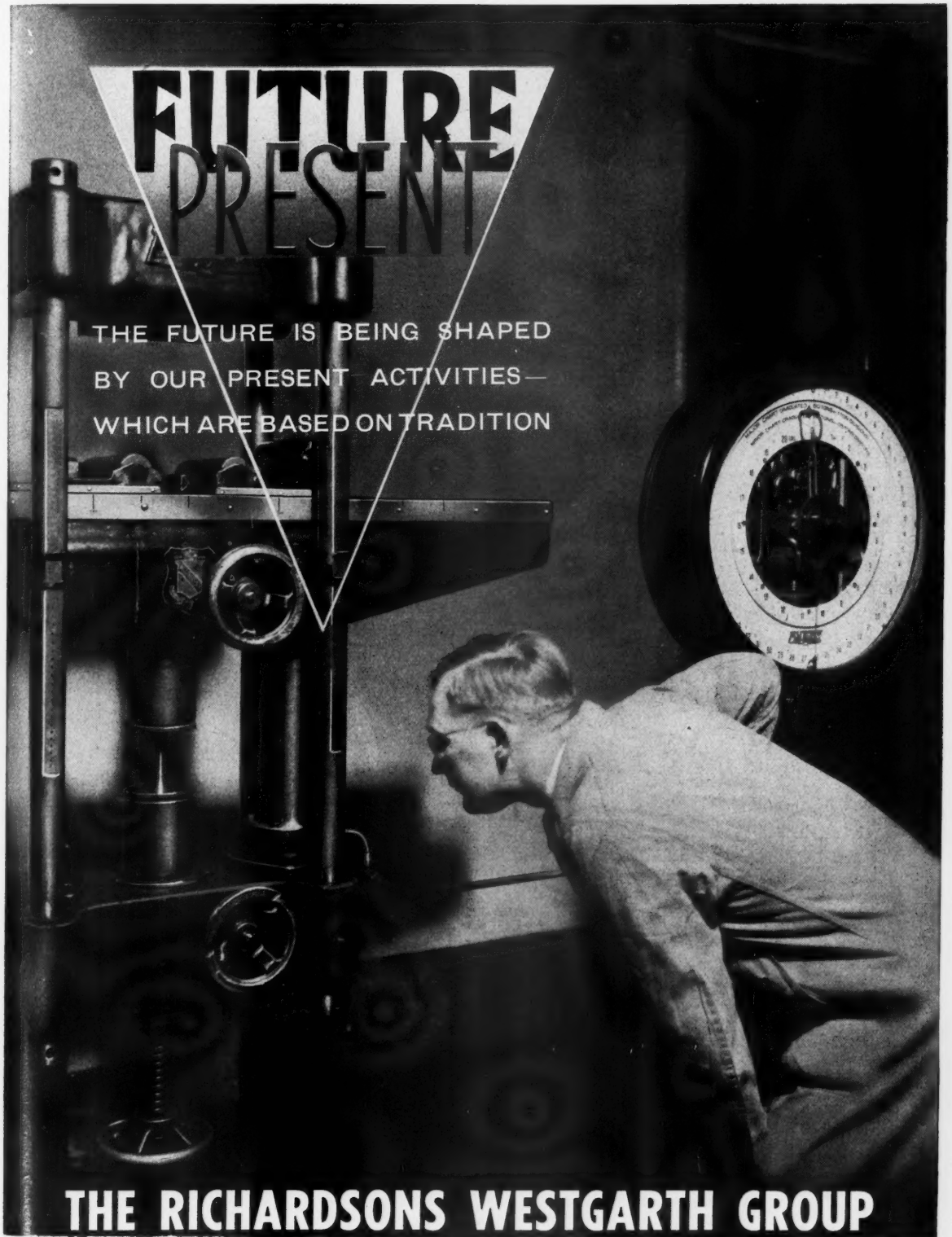

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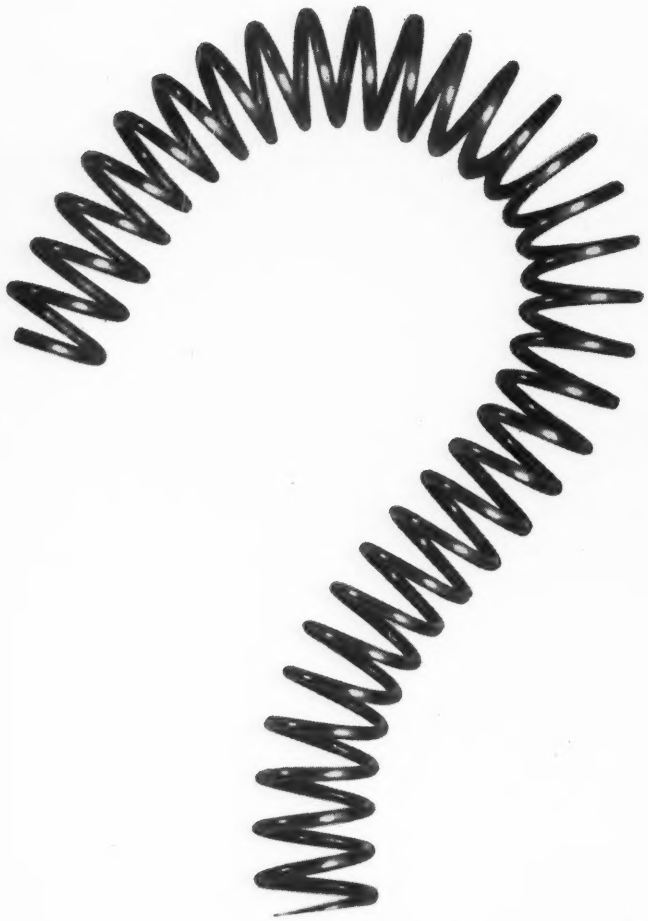

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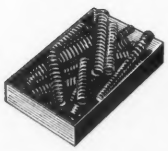
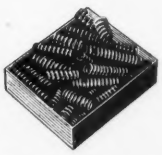
(Makers of fine Springs, Wireforms and Presswork for over a century)



No. 760. 3 doz. Assorted Light Compression Springs 1″ to 4″ long, 22 to 18 S.W.G., ¼″ to ⅜″ diam. 6/6 each.



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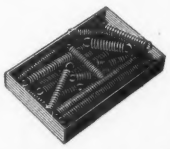

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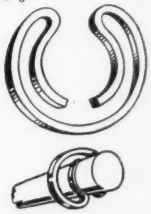

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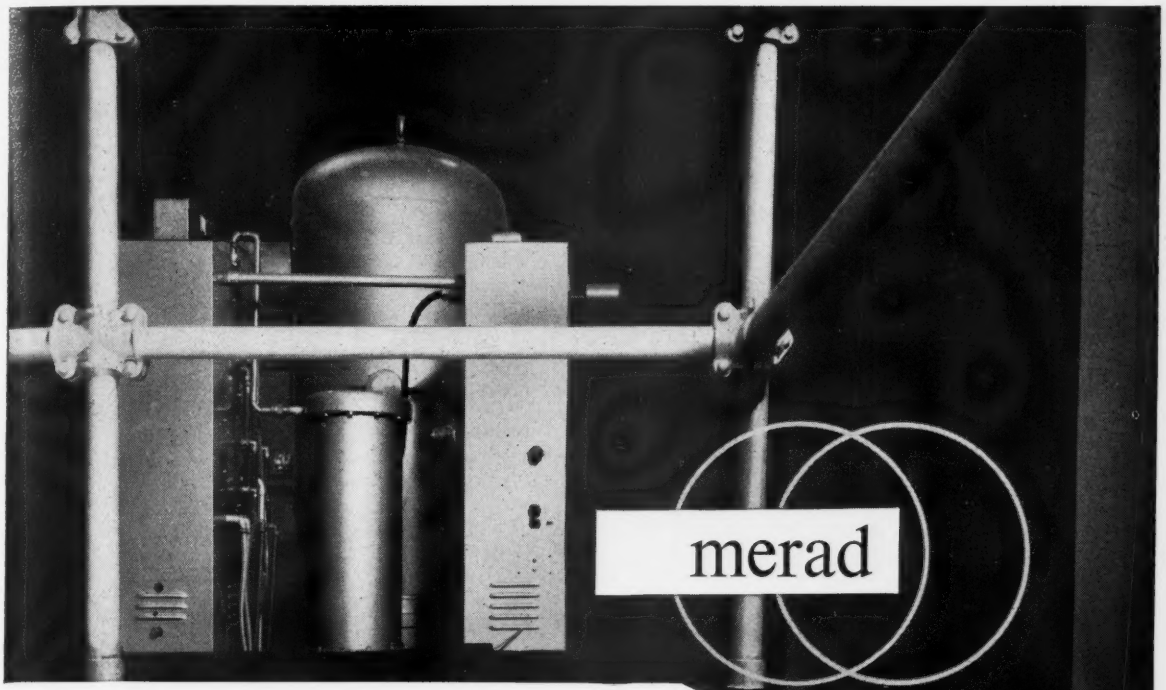
HT22



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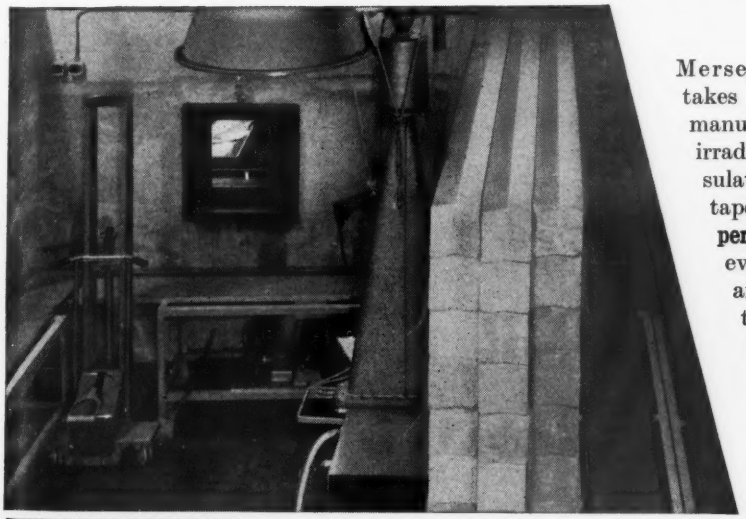

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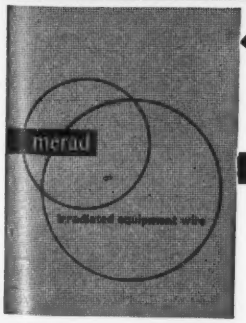

This leaflet is offered to all those who are interested in these irradiated products.

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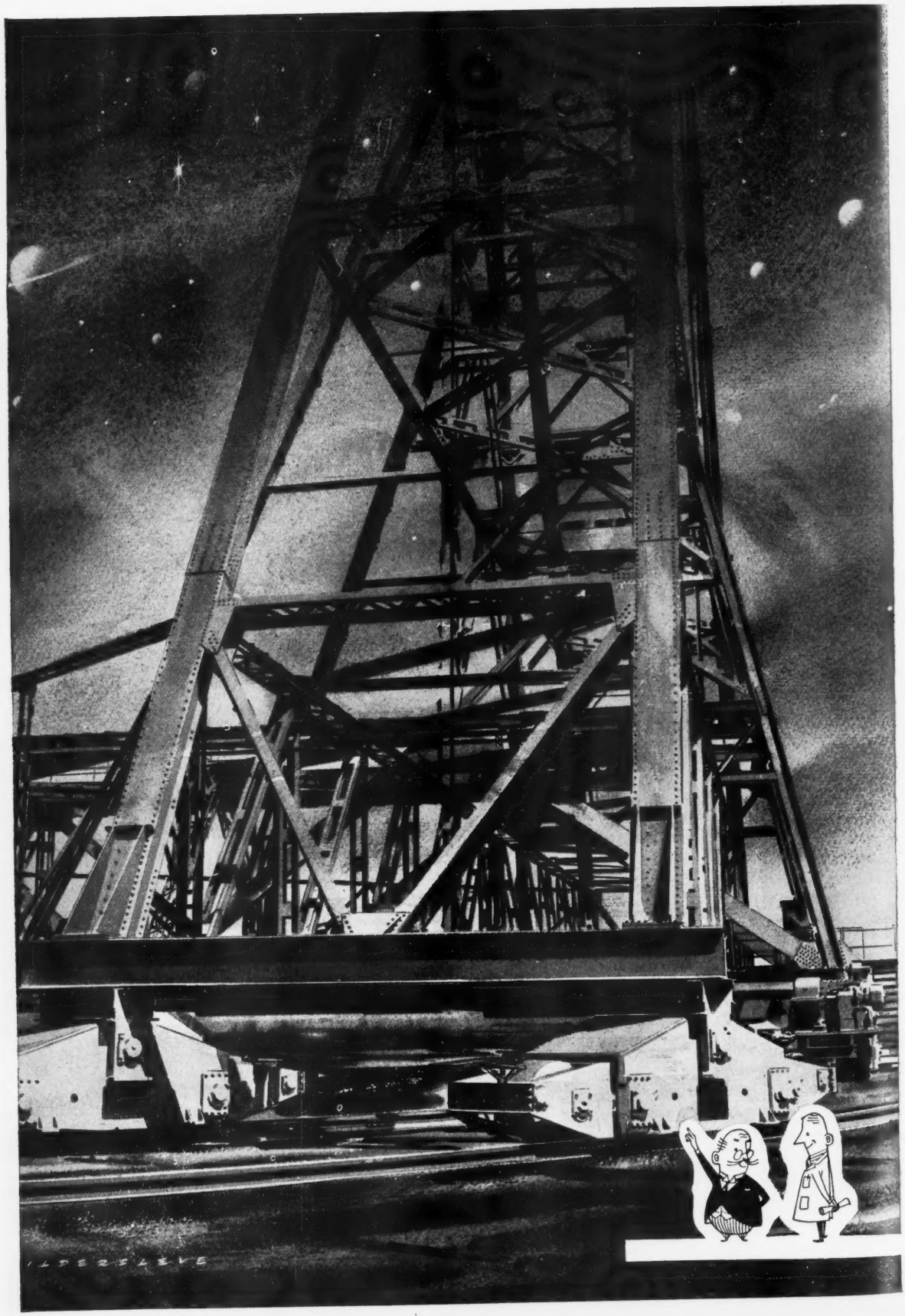
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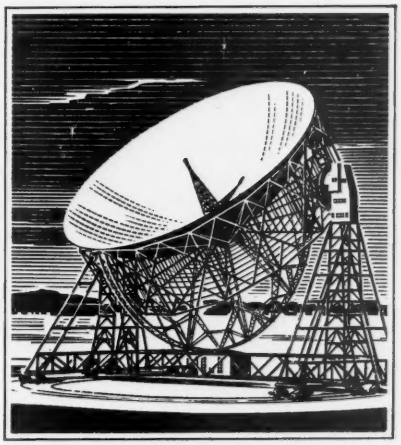


With acknowledgements to the consulting engineers, Messrs Husband & Co., Sheffield

The new Jodrell Bank Radio Telescope, with a 250 ft diameter paraboloid reflector bowl, is the largest instrument of its kind in the world. Brush Electrical Engineering Co. Ltd, have been responsible for the manufacture, supply and installation of all the electrical machines, power control gear and equipment providing the motive power for both Azimuth and Elevation movements, and the electronic equipment which converts the required position signal received from the computer into the movement control of the drive motors.

But how on earth will they manoeuvre this masterpiece?

Ah, that's where Brush come in, sir. To be fully effective, the radio telescope has to be capable of being swivelled completely round, and the reflector bowl tilted towards any point in the sky. All with hair's-breadth precision, too.

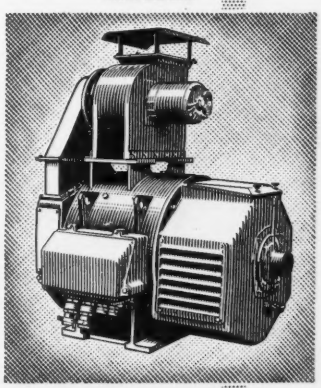
But that's surely very difficult. The whole thing weighs nearly two thousand tons, doesn't it?

Yes indeed. In fact the reflector bowl itself weighs about six hundred tons. But the Brush driving motor systems — with the gearing which has been provided — can cope all right. It's all done with eight 50 h.p. D.C. motors. Two in the base of each tower, driving these bogies which carry the whole structure around on its circular railway track. And two more at the top of each tower, driving the elevator mechanism. They are fed from two motor generator sets housed in the central pivot room.

Hm. I — I should think these movements are a bit difficult to control, aren't they? I mean, with this tremendous great thing, and this hair's-breadth precision business, it must be quite tricky.

Particularly when you consider that operation must be quite smooth and at a constant speed, despite pressure from high winds. As a matter of fact, it's all done electronically. You see, the exact positional requirements are determined by a computer. This generates the signals which define the demand position. Then the Brush electronic panel, responding to these signals, governs the speed at which the motors run, and operates the brake circuits . . .

Er, quite! I'm sure it's all most fascinating. A veritable triumph of skill and ingenuity. Let's just say that the power side of the project was handled by Brush, and leave it at that, shall we?



The illustration above shows one of the eight D.C. drive motors installed. These are of our standard 'K' type construction provided with separate forced air cooling, the ventilating fans being mounted on top of the machines. Rating is 50 h.p. at 1000 r.p.m.

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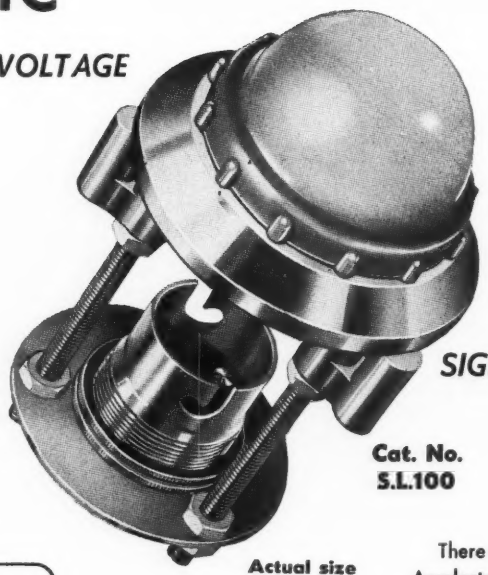

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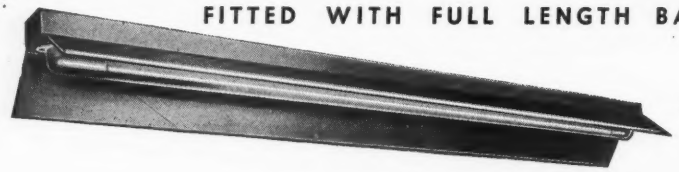

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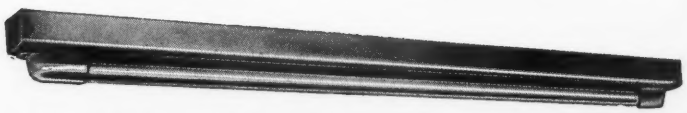

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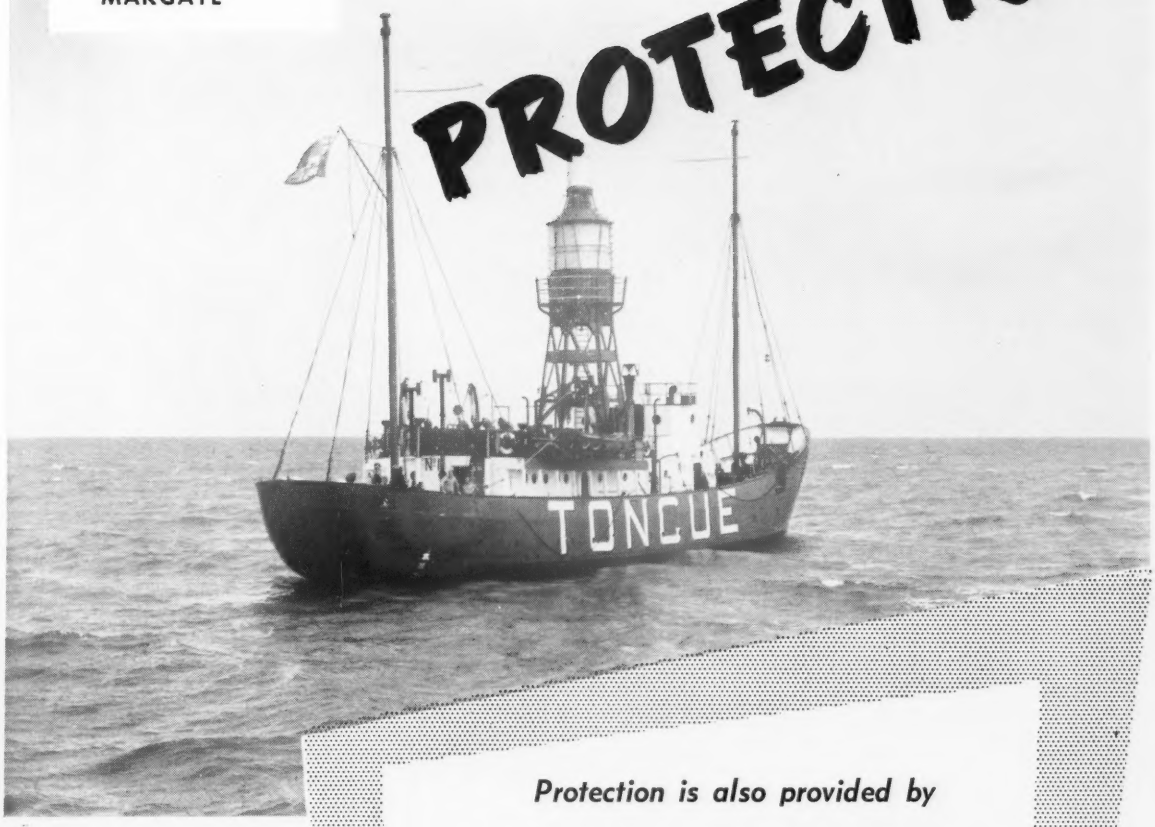

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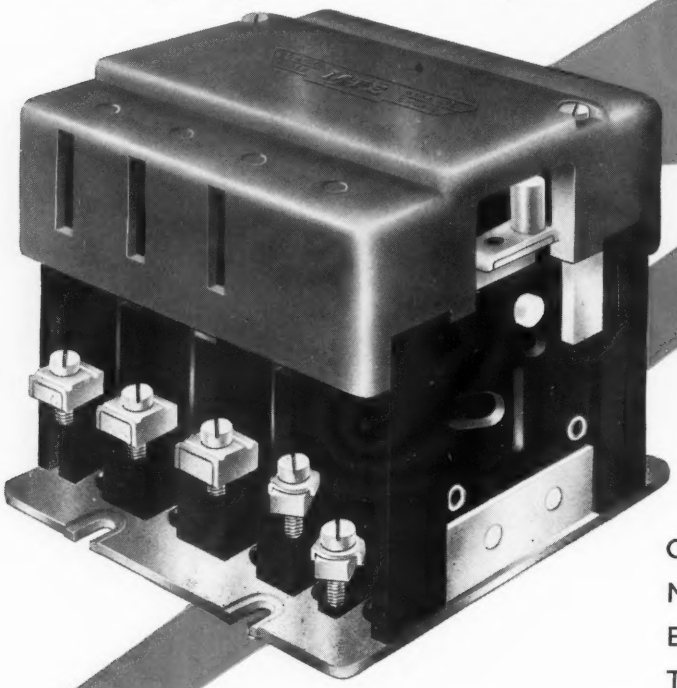

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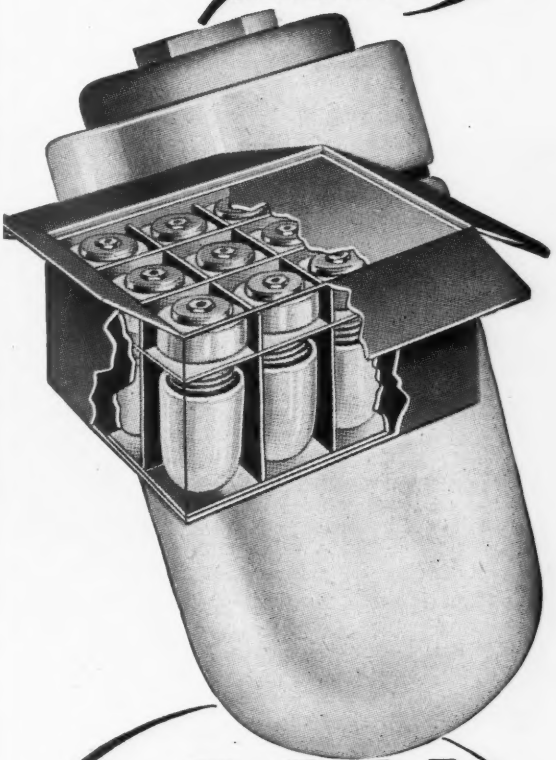

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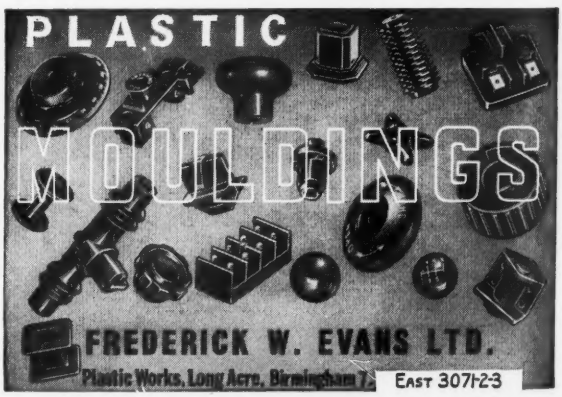

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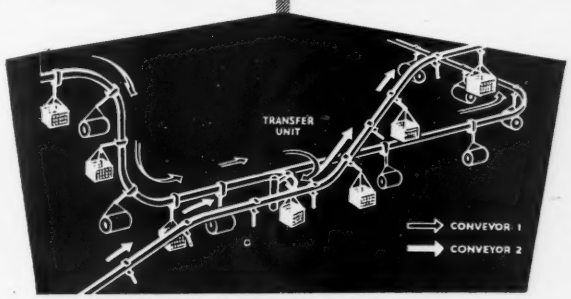

1 TRANSFERS Stanrun AUTOMATICALLY transfers preselected loads from one conveyor to any others and at variable speeds.

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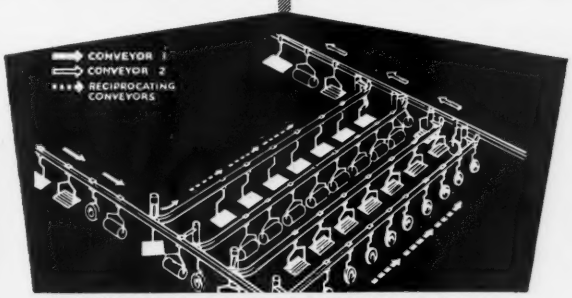
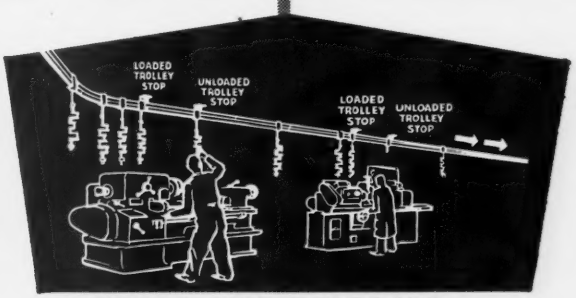
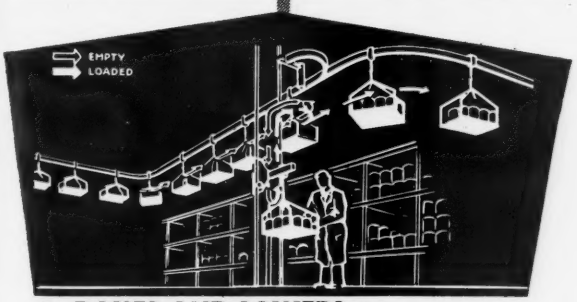


3 SELECTS AND MARSHALLS Stanrun AUTOMATICALLY selects and marshalls various components into their respective storage lines, then issues them in the required sequence.



4 HOLDS AND RELEASES Stanrun AUTOMATICALLY queues components in the correct order for a given process. Trolleys await their loads before continuing the production cycle.



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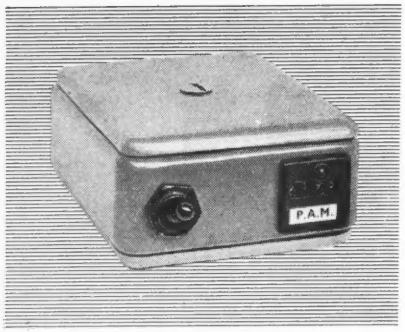
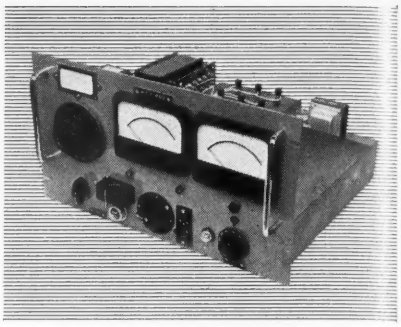
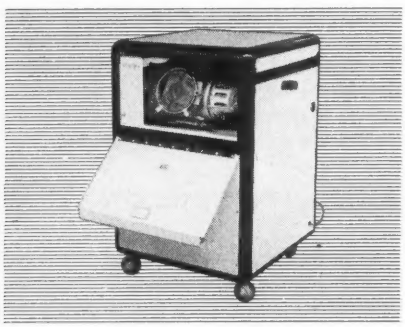


Above:
Transistor Battery Portable Counter, designed for counting small production quantities at a maximum rate of 4 per sec., with a built-in photo-electric cell, or alternative remote photo-electric cell probe. Battery life gives 250,000 continuous counting operations. Size $4\frac{3}{4}''$ x $3\frac{3}{4}''$ x $1\frac{7}{8}''$.

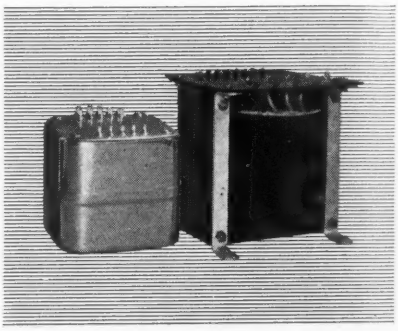
Right:
Stabilised Power Supply Unit. Another example of the type of instrument we design and manufacture is this unit, made for the Edison Swan Electric Co. Ltd., for laboratory valve testing apparatus.



Below:
Open and Shrouded types of Transformers for general use in electronic equipment. Designed and manufactured to individual requirements.



Left:
"Nera" Model PC.50, a floor console projection television receiver, designed for industrial use with Closed Circuit Television. Picture sizes—30″ x 22″, 40″ x 30″ and 48″ x 36″, on special activated aluminium screens.



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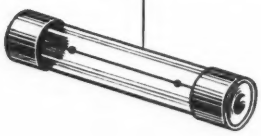

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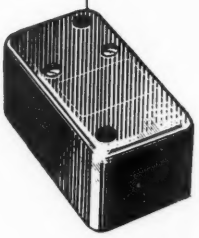

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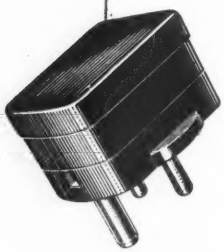

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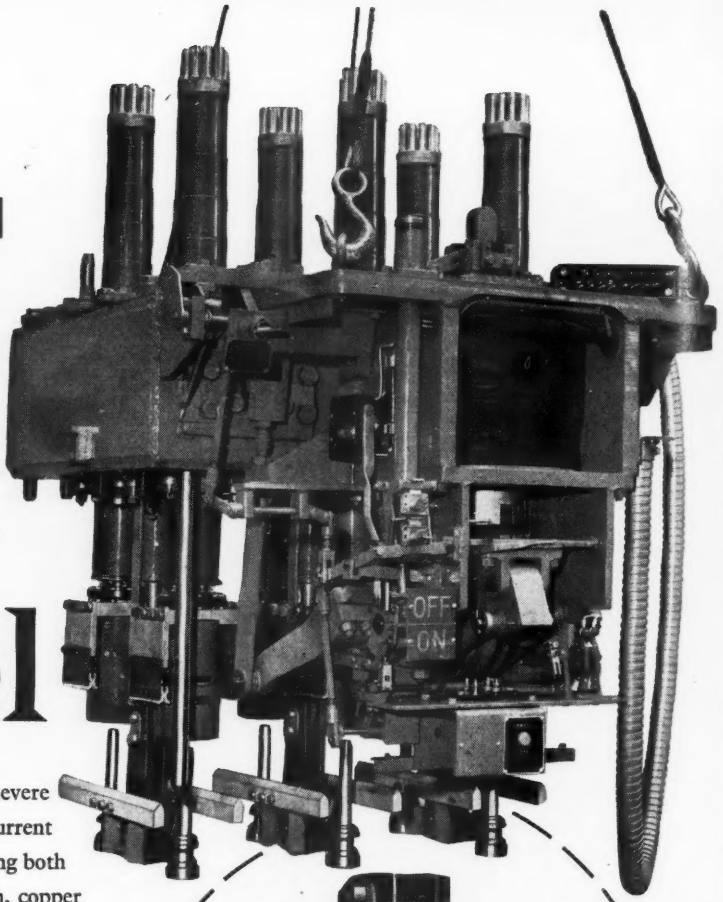

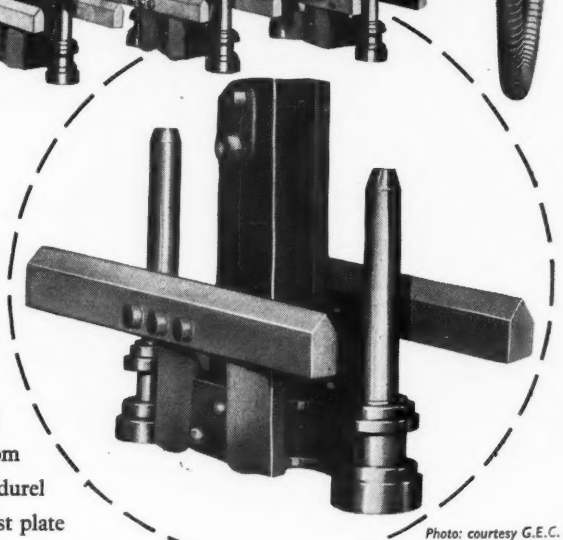

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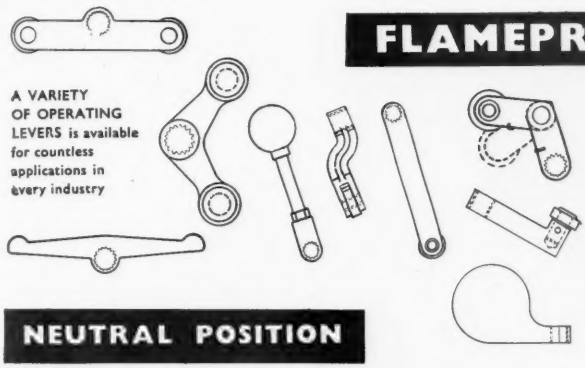

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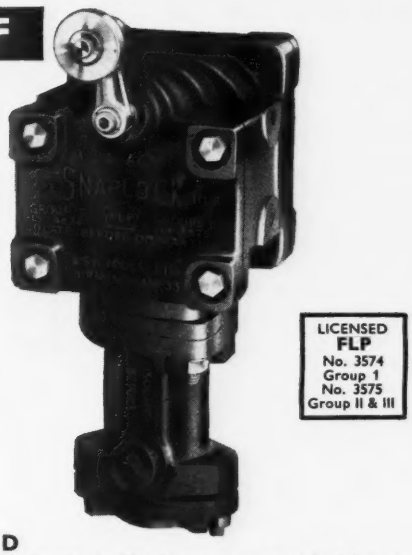

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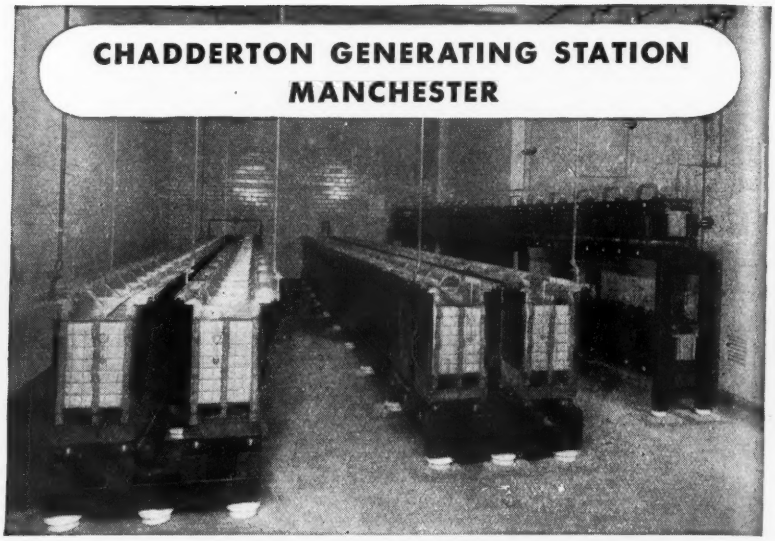

Illustration shows the installation of a 240 VOLT TUNGSTONE BATTERY Type B.S.S.D.11 500 A.H. and 2 Batteries of TUNGSTONE enclosed type, of 100 A.H. and 75 A.H. respectively at Chadderton Generating Station.

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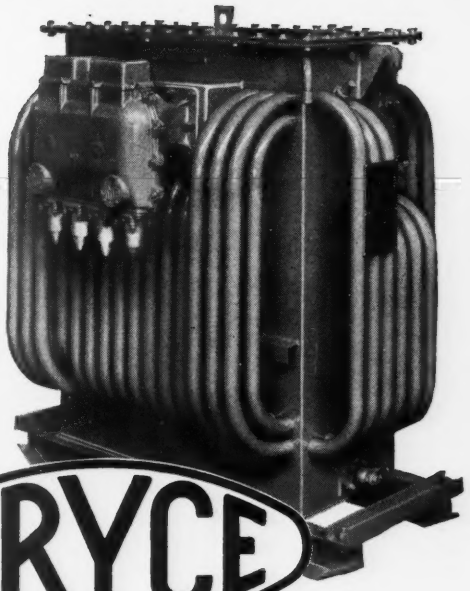

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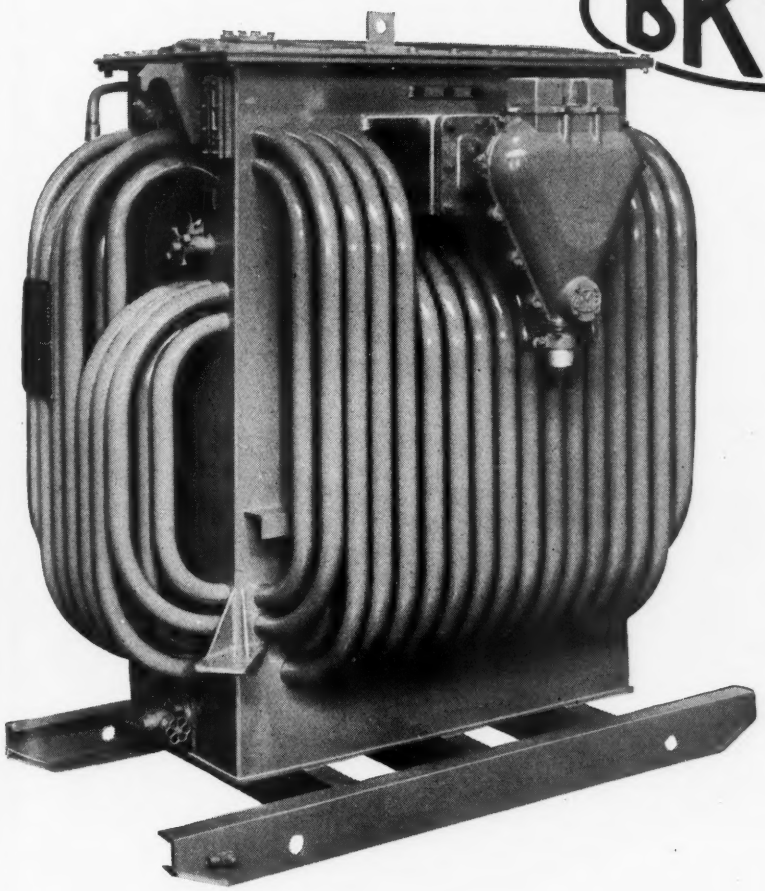

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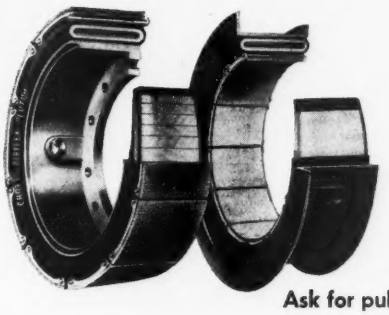

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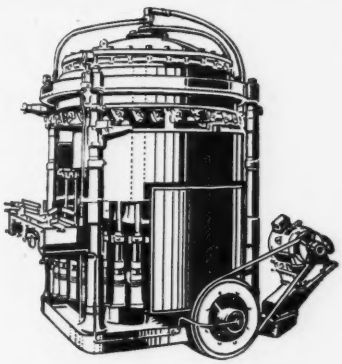

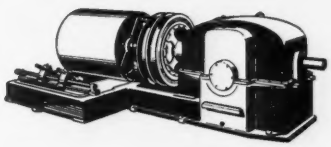

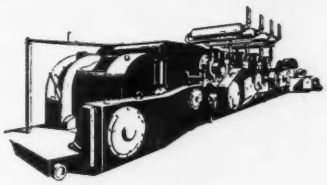

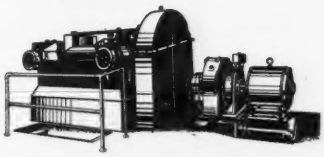

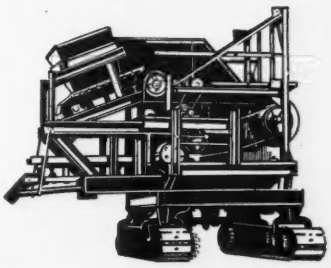

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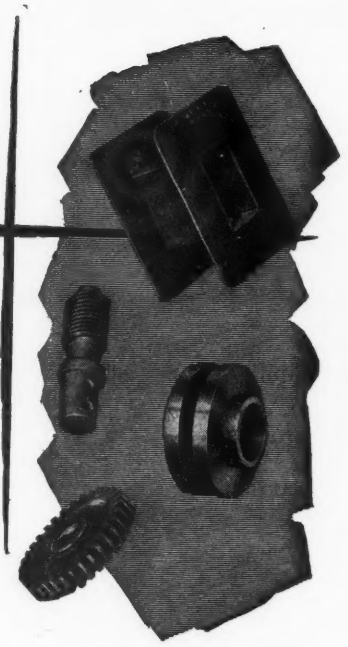

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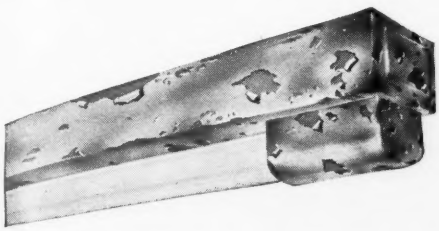

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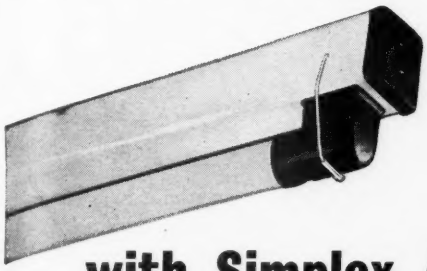

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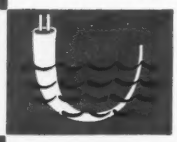

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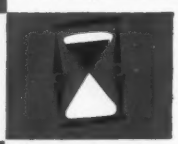

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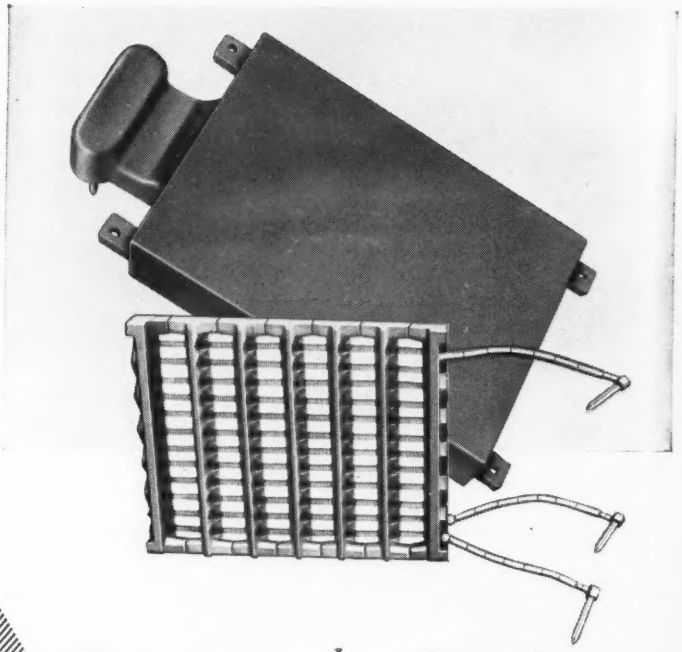

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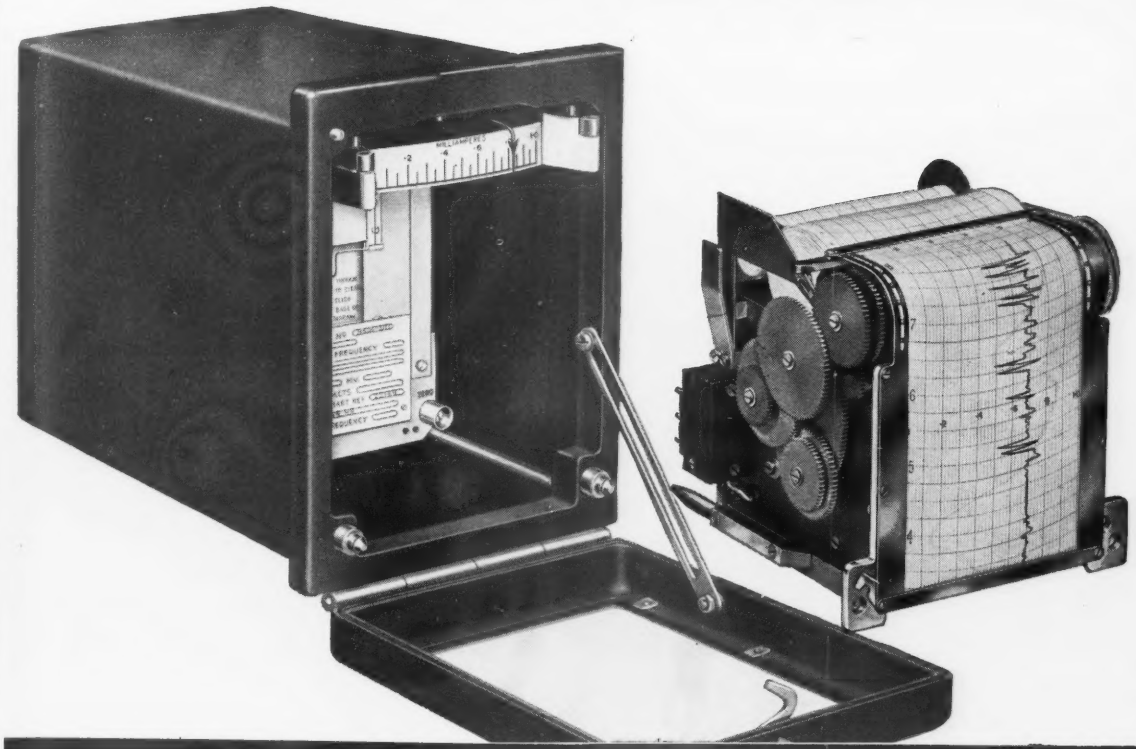

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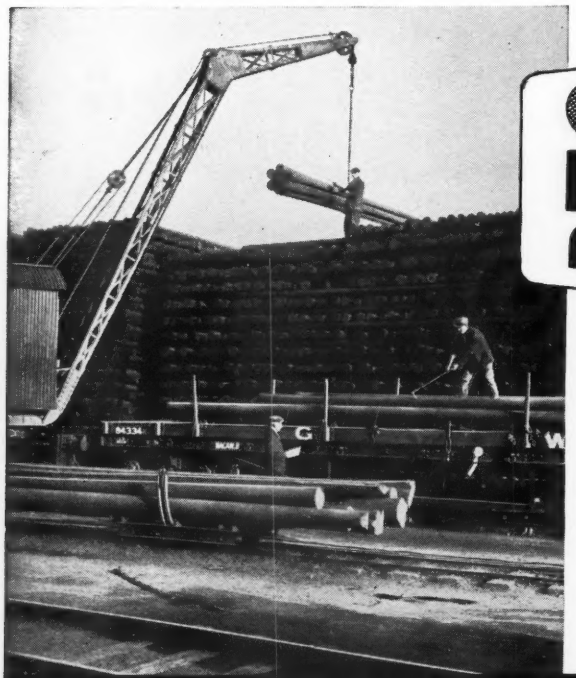

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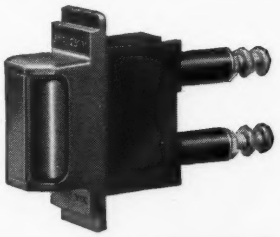

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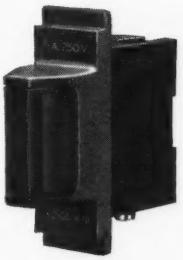

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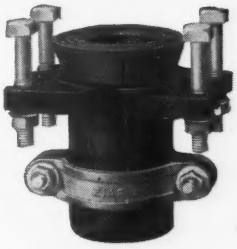

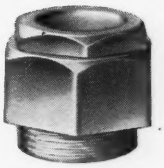

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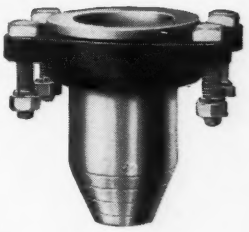

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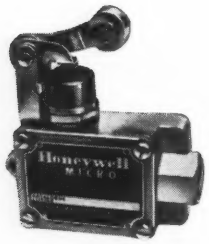
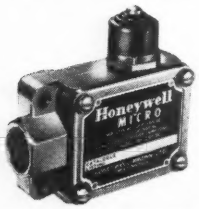
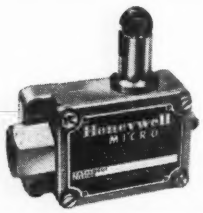


Catalogue Listing BAF1-2RN2-LH.
Designed for cam or slide operation; actuated by an adjustable roller arm.
Left hand mounting version.



Catalogue Listing BAF1-2RN-RH.
Sealed plunger actuation—for in-line motion.
Right hand mounting version.

Catalogue Listing BAF1-2RN4-LH.
A 1½" diameter adjustable button permits rapid hand actuation.
Suitable for manual control of power equipment.
Left hand mounting version.



Catalogue Listing BAF1-2RQN8-RH.
A sealed roller-plunger actuator permits operation from directions not in line with plunger movement.
Right hand mounting version.

Contact Honeywell for Micro Switches which have been specially designed to meet your heavy duty specifications.

Heavy Duty Construction A sturdy aluminium case protects the switching unit from physical damage.
A rubber gasket between cover plate and enclosure prevents the entry of liquid splash, dust and other foreign matter.
Cover screws are of the captive type.
All materials within the housing are corrosion-proof.
The basic switch unit is easily replaced.

Plant-Wide Application BAF1 switches can handle steady state currents of 20 amps up to 460 volts A.C. and inrush currents as high as 75 amps.
All switches have an internally tapped ¾" conduit fitting and an alternative left or right hand mounting. Roller arms are adjustable through 225°.
This remarkable versatility makes the BAF1 range most suitable for cost-reducing standardisation.

Precision Plus BAF1 switches, like the entire Honeywell range, are designed, produced, and tested against specifications determined after close study of user's needs.
Each switch offers the optimum combination of precision, long life and special purpose characteristics.

Write for Catalogue 83a—it gives full details of the many industrial enclosed switches available—to Honeywell-Brown Ltd., 1 Wadsworth Road, Perivale, Greenford, Middlesex. PERivale 5691.
Expert advice on switching problems is freely available from Honeywell Branch Offices at London, Birmingham, Manchester, Middlesbrough, Sheffield, Cardiff, Leeds, Belfast, Dublin and throughout the world.

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First in Precision Switching

the big, new, exciting range of electric heaters from dimplex

Which really cater for every home, every purse and pocket!

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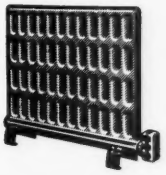

The famous 'Dimplex' permanently oil-filled thermostatically controlled electric radiators. Big range of models, ½ — 2 kW. Eight colours.

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Domestic Infra-red Heaters incorporating new features.

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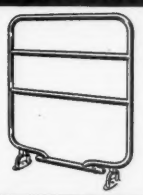

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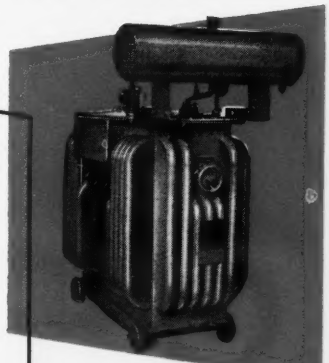

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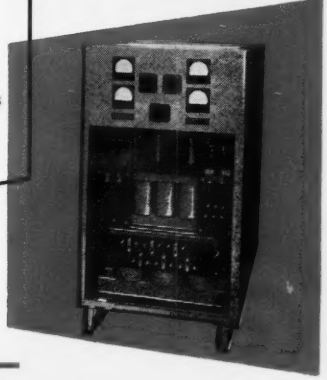

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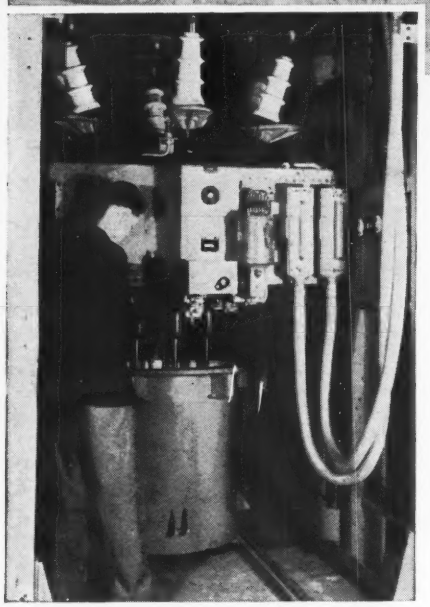

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Above: Seven-panel switchboard on a restricted site in South Wales.

Left: Single unit with tank lowered and breaker in isolated position.

S·W·S

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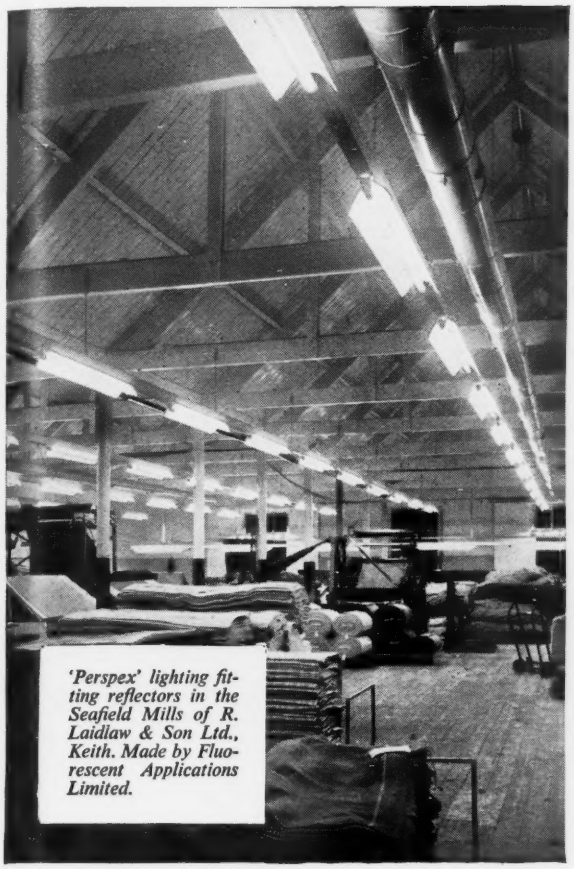

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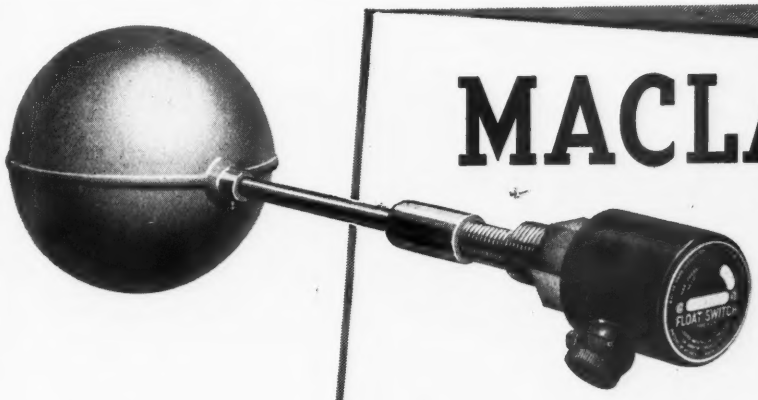

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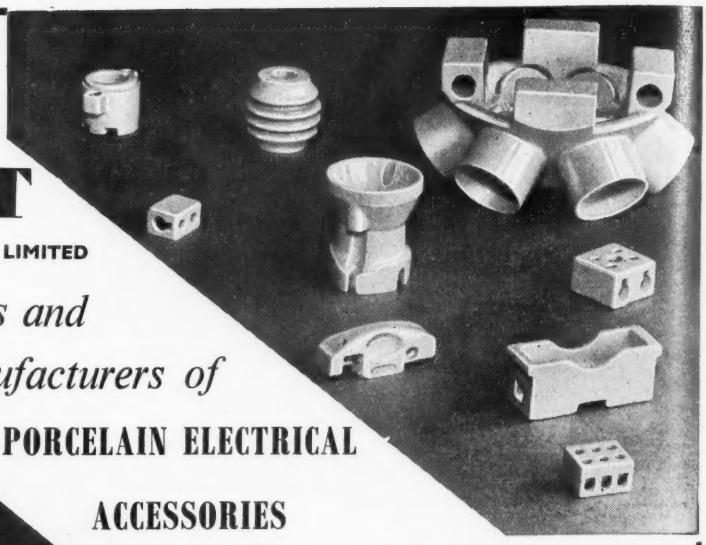

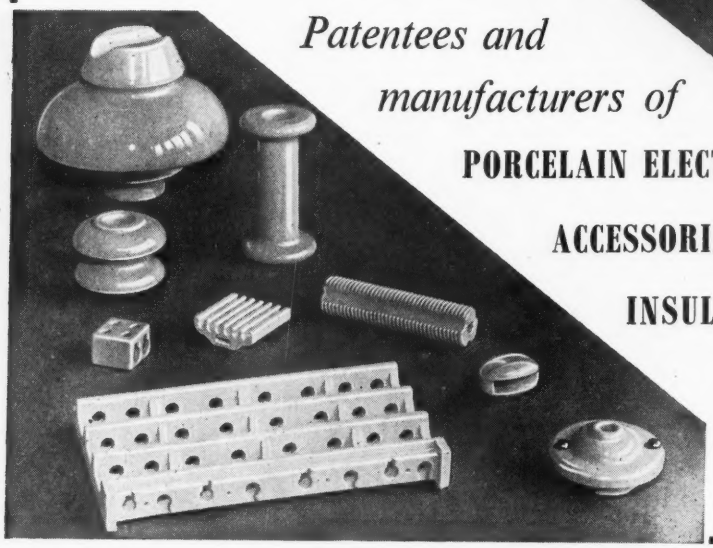

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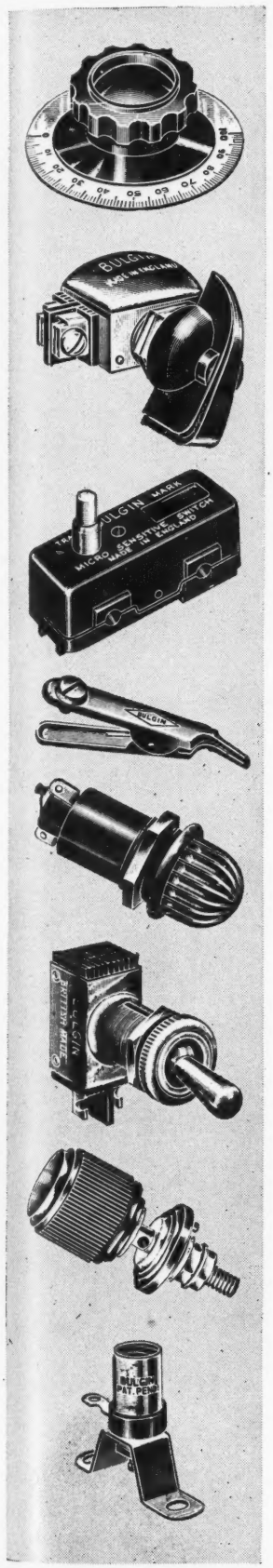

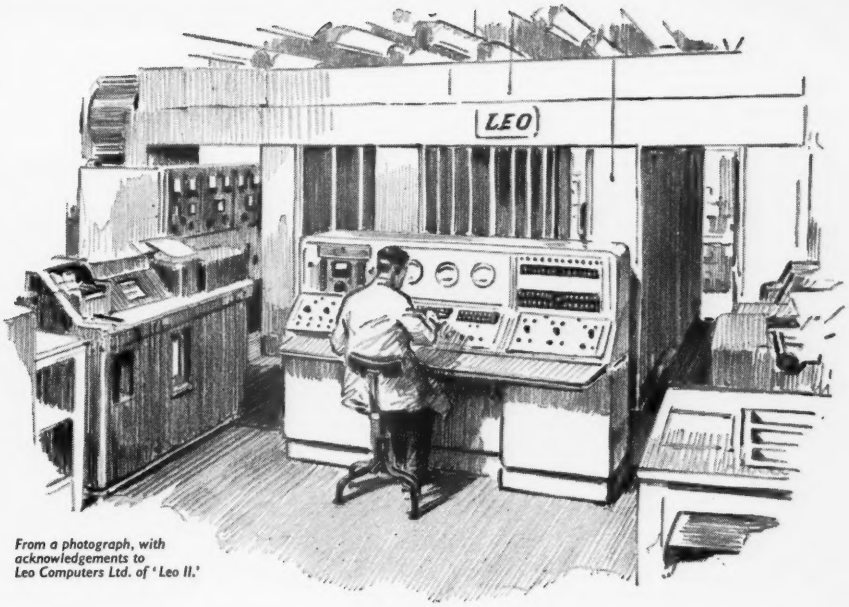

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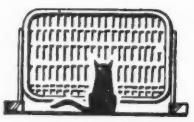

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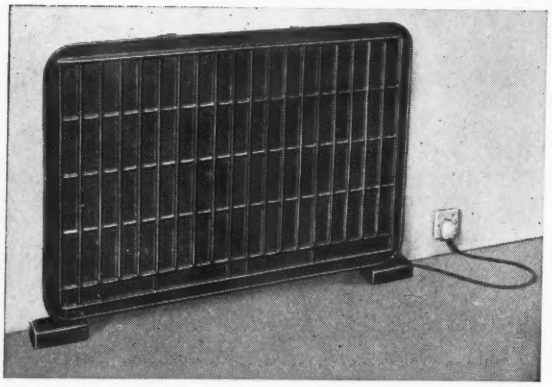

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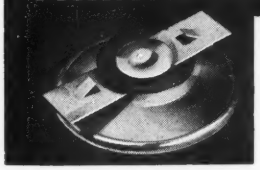

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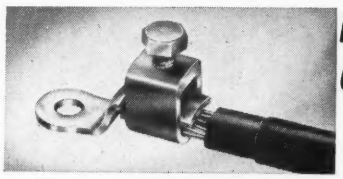

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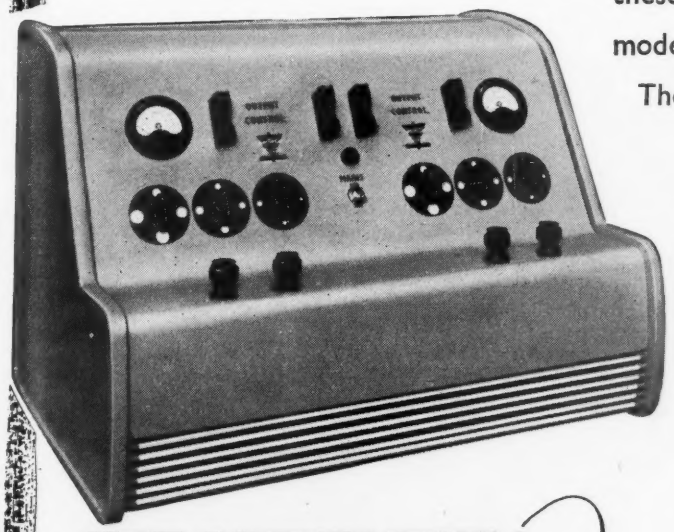

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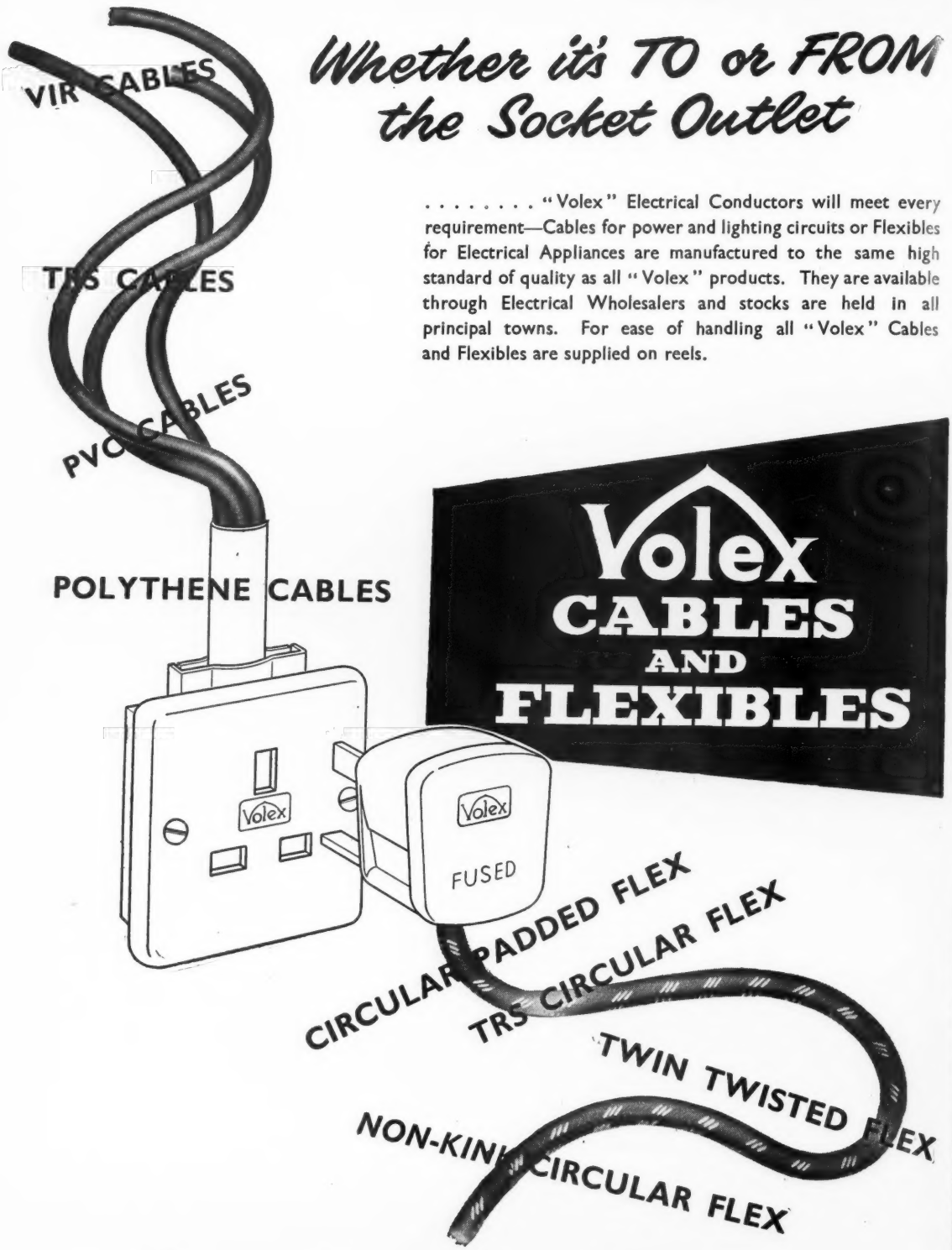

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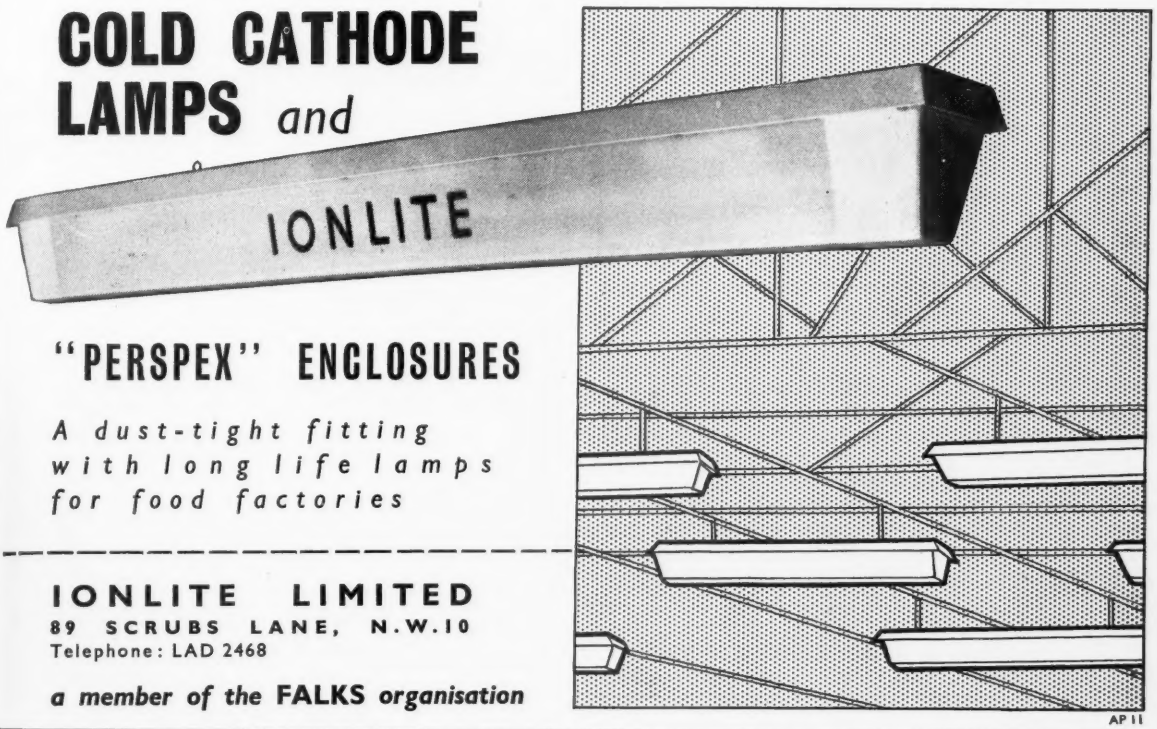

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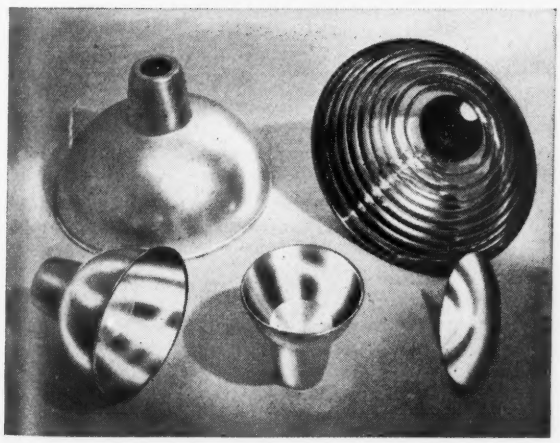

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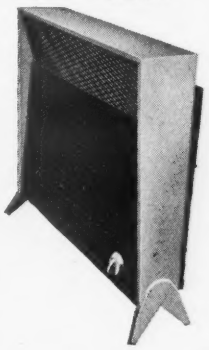

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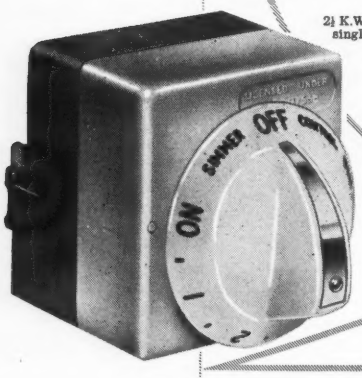

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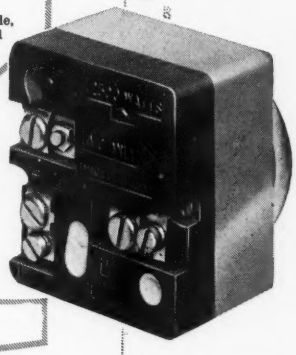

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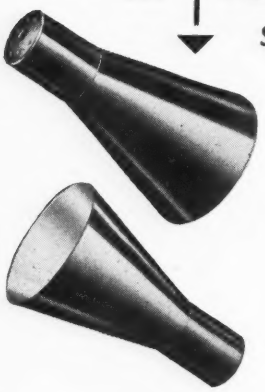

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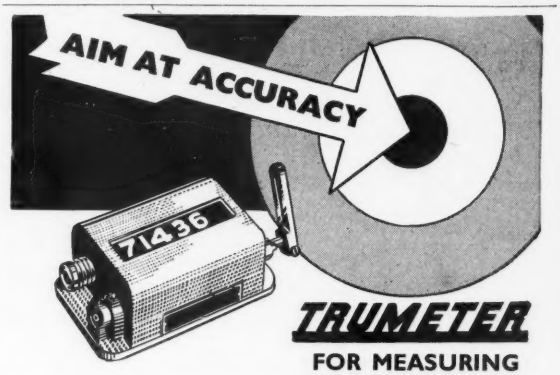

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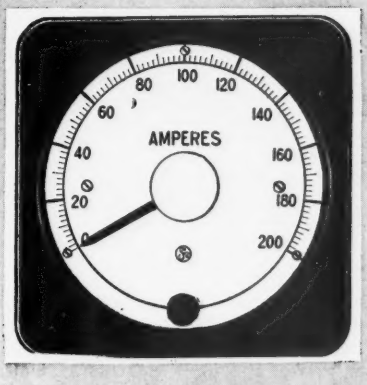

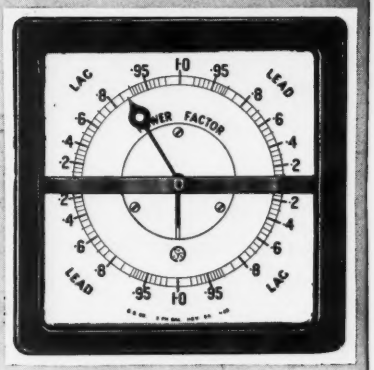

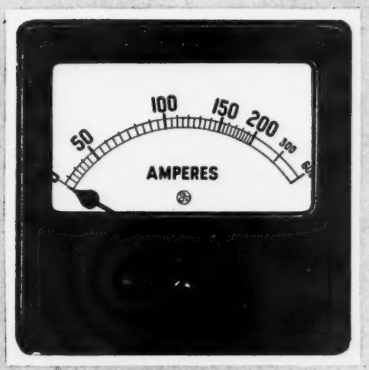

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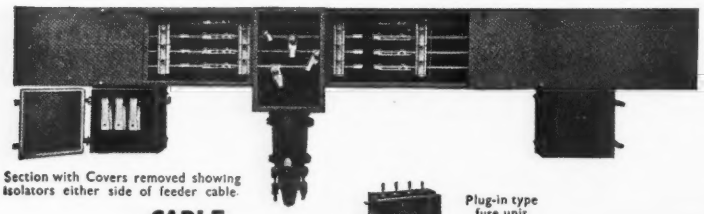

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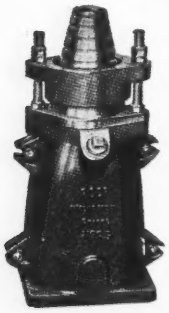

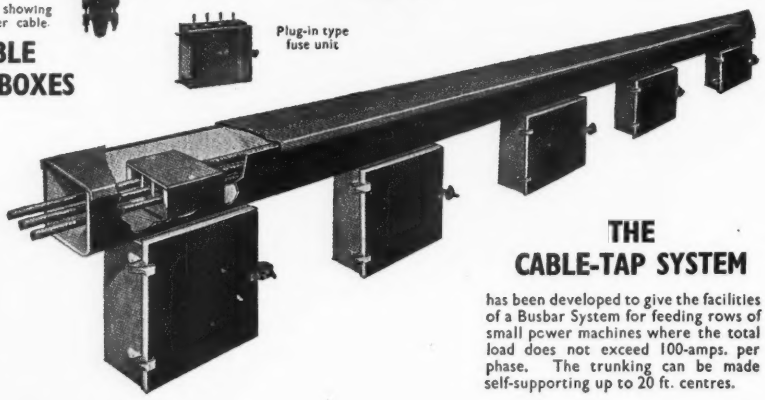

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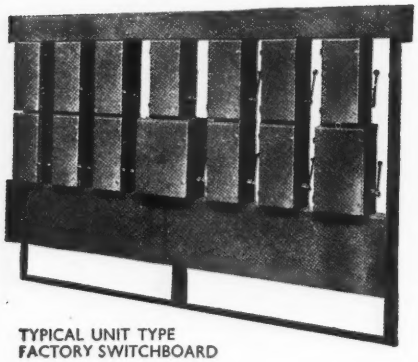

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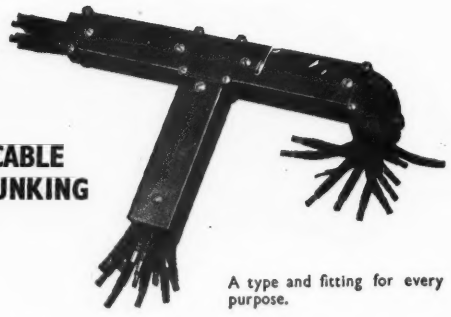

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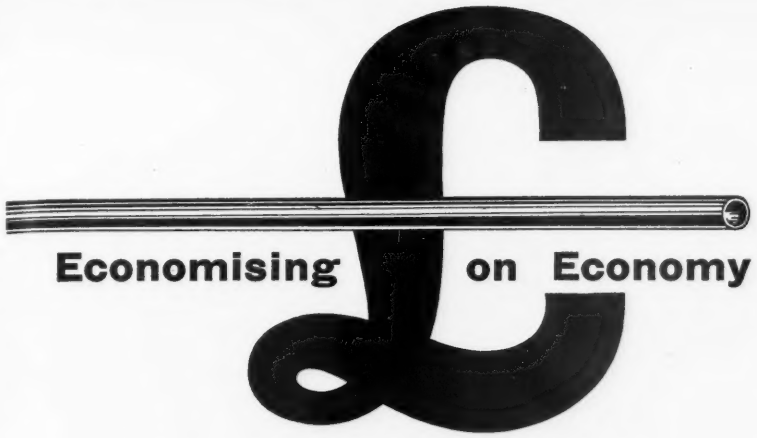

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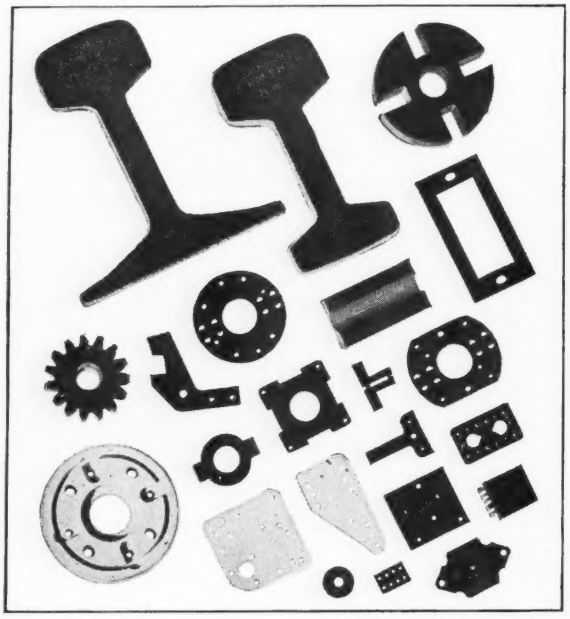

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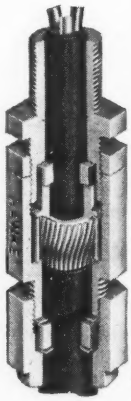

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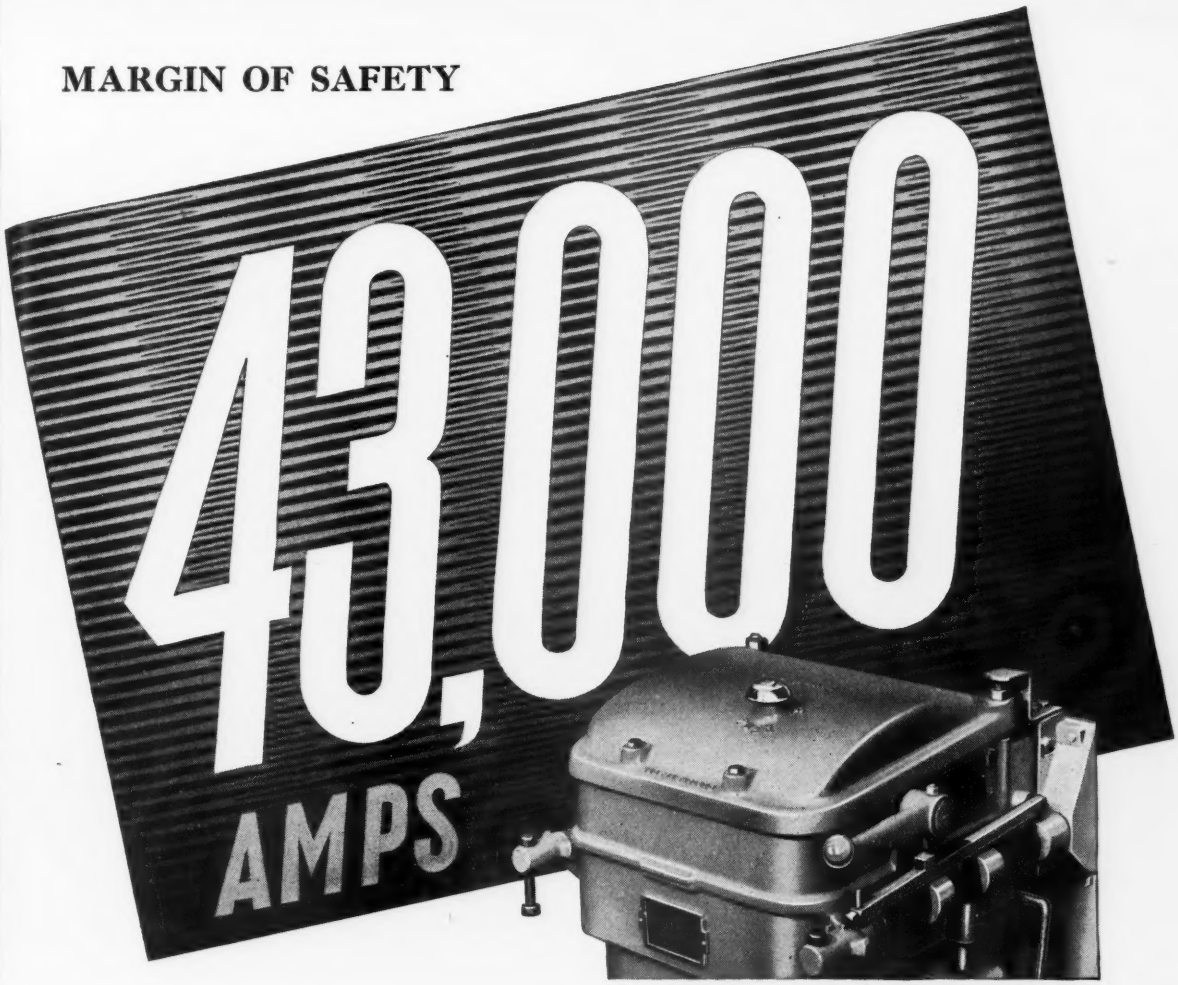

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1957

ELECTRICAL REVIEW

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ELECTRICAL REVIEW

26 July 1957 Vol. 161 No. 4 Established 1872

The Committee, the Bill and the Act

THE Committee of Inquiry into the Electricity Supply Industry under the chairmanship of Sir Edwin Herbert was appointed in July, 1954, and reported eighteen months later. Barely a year afterwards a Bill embodying most of the Committee's recommendations was presented to Parliament, and after a further eight months in the parliamentary machine the Bill became law. In these three periods the future pattern of electricity supply in England and Wales has been hammered out, and it is likely that the Bill which received the Royal Assent last week will define the main lines of the supply industry's organisation for the foreseeable future. In the first period a lay committee, whilst giving consideration to very extensive representations from within the industry, did its best to formulate a disinterested, outside view of the situation. In the second period, the Government made its choice of a workable solution, and framed a Bill accordingly. In the third period, members of Parliament on both sides and in both Houses have expressed their views, by debate and vote, in an earnest attempt to secure a viable and acceptable Act.

The result of all this work and deliberation would appear to complete something of a cycle in electricity supply nationalisation. The initial Act of 1947 covered the whole country except the North of Scotland—that is to say, electrically, about 98 per cent of the total field. A single body was responsible for generation and also for the co-ordination of distribution and for a general control over policy, whilst fourteen Area Boards did the actual work of distribution. The next piece of legislation exhibited those phenomena of fission and fusion so familiar to atomic scientists, for whilst the two South Scotland Boards were severed (administratively but not electrically) from England they promptly coalesced and took over the combined functions of generation and distribution. The completion of the cycle sees England and Wales provided with a three-fold system of Generating Board, Area Boards for distribution, and an Electricity Council to advise and assist.

This latter is unquestionably the weakest element in the reorganisation. As Mr. D. J. Bolton points out on another page, whoever gains under the new dispensation the supply industry as a whole has certainly lost something of its authority, and it is likely to find itself in an appreciably weaker position *vis-à-vis* the Minister of Power. As originally constituted, the Central Authority could represent, and on occasion speak for, the whole industry. Not only did it cover virtually the whole of the field but it

had some effective jurisdiction over that field. The clauses governing its relations with the Area Boards were provided with teeth even if those teeth were seldom bared and perhaps never actually used. Now those teeth are drawn, and the new Council is provided only with a set of "artificial dentures" whose fit and masticating powers promise but poorly.

FREEDOM OF CHOICE

Electricity is the only feasible agent for the performance of a number of domestic services, e.g., suction cleaning, radio and television and (strictly speaking) lighting. Yet all of these are "light current" applications and by themselves do not justify the cost of the necessary mains and services. This has forced electricity supply authorities to stipulate guaranteed minimum payments or insist on the provision of full facilities for the use of electricity. The latter condition has often meant the exclusion of gas from municipal housing schemes, to the natural anger of the gas authorities.

The problem is an old one but it seems to have cropped up with added force in Scotland. The chairman of the Scottish Gas Board recently said that the tactics of the Electricity Boards threatened not only the domestic gas business but the future of an industry essential to the national economy. In earlier days, when gas was in the ascendant, our industry was insistent upon freedom of choice for consumers and it cannot now abrogate that principle. A possible compromise is for municipal housing authorities to arrange that a sufficient number of their houses shall be all-electric to satisfy the Electricity Boards' requirements, while the remainder are equipped for gas, as well as electricity, if the tenants want it that way.

VARIETY IN AUTOMATION

The common view that the so-called "automatic factory" would carry mass production methods a stage further in the direction of creating the repressive uniformity of products was authoritatively denied at the B.I.R.E. Convention on Electronics in Automation. The control of factory operations by electronic digital computers was said to give an ability to make a great variety of goods in different details of design to meet individual requirements. The chief resemblance to older mass production would persumably lie in lower prices of the finished articles.

THE NUCLEAR FUTURE

In the W. M. Thornton Lecture "The Impact of Nuclear Energy on the Twentieth Century" which Dr. T. E. Allibone gave to the Association of Mining Electrical and Mechanical Engineers recently (see *Electrical Review*, 28th June), he said that, judging from experience in connection with the hydrogen bomb, it seemed reasonable to believe that we should be able eventually to use the hydrogen development for the production of electricity. He also said that if we did succeed in doing this then the energy problem for the whole world would be solved for ever.

In the past we have been accustomed to a period of development in the electrical industry when the next move could be fairly safely forecast a few years before: for example, alternator sizes and cooling, higher steam pressures and temperatures, etc. The development of nuclear energy, however, has come in quite a different way and at quite a different pace. We are now always on the verge of something completely revolutionary and Dr. Allibone's statement is not mere fantasy. There is also the possibility that eventually we shall be able to make use of controlled nuclear energy directly for some purposes as distinct from its use through the medium of electricity.

ACCIDENTS IN THE HOME

It is, to say the least, alarming when one reads such a long list of fatal electrical accidents in the home as that sent to us by the Home Office from which some examples are published in this issue. Broadly, the causes of the accidents fall into three classes: carelessness in the use of electrical apparatus; the use of faulty apparatus; and the installation of electrical equipment by incompetent people. Ignorance in one way or another is the root of all these categories and in every case it is up to one or another section of the electrical industry to overcome this. In particular, attention should continue to be drawn to the serious risk involved in using portable electrical apparatus in bathrooms.

THE ACADEMIC BACKGROUND

In our Leader last week in which we commented on Mr. Goldup's article, "Professional Qualification," we find that in paragraph 4 the term "technologist" has inadvertently been used twice where "technician" was intended.

There can be no harm in stating again the general definitions that (1) the technologist is the professionally qualified man with the broad grasp of his subject and the science and technology on which it is based; (2) the professional electrical engineer is the technologist who is professionally qualified in the field of electrical engineering; and (3) the technician is concerned with a particular field of application for which he has a specialised education and training.

ENSURING EQUIPMENT RELIABILITY

The capacitor is essentially a simple item of electrical equipment, but a lot of effort has to be put into its manufacture if it is to have the high degree of reliability required when it is used as a means of power factor correction. Ideally, the capacitor should have perfect insulation so that it will give long and trouble-free service and for this reason elaborate precautions must be taken during manufacture to ensure that no foreign matter can settle either on the insulating paper or metal foil during the winding process.

In this issue we describe a new power capacitor factory which has been built in South London, the design of both the building and equipment being such as to ensure a consistently high quality product. This has involved the company concerned in a great deal of expense, the major part of the factory being sealed from the outside atmosphere and air-conditioned to ensure scrupulous cleanliness during all stages of manufacture.

POWER CAPACITOR MANUFACTURE

New London Factory Established by Johnson & Phillips

THE financial inducements offered to industrial consumers by the electricity supply authorities to encourage them to maintain a good power factor have greatly increased the demand for capacitors for power factor improvement. The demand is likely to be further extended by the investment allowances recently announced by the Chancellor of the Exchequer on capacitors installed for this purpose. To meet this growing demand Johnson & Phillips, Ltd., have built a new capacitor factory at their Elizabeth Works, New Cross, which is claimed to be the most modern of its kind in the country. The previous factory at Victoria Works, Charlton, is being vacated and frees much needed space for the expansion of the company's cable factory.

The new factory has been specifically designed for the production of high quality power capacitors. The most modern vacuum engineering techniques are being used for drying and impregnating the elements and elaborate precautions are taken to ensure scrupulous cleanliness during all stages of manufacture. In this connection it is of interest to record the following extract from the last annual report of the E.R.A.:—

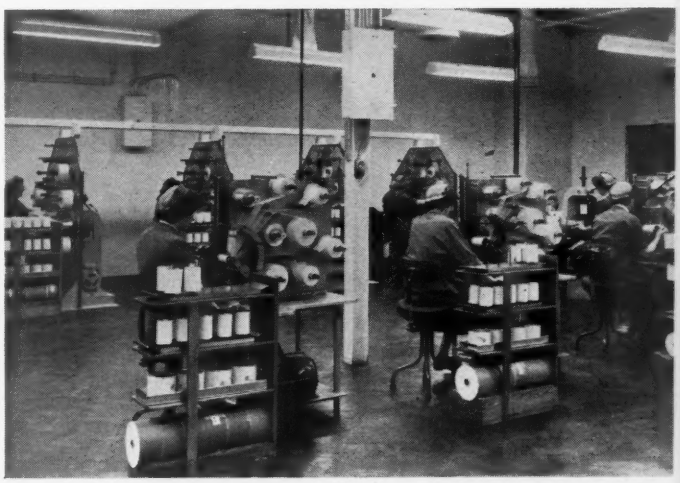
"The mechanism of inception of discharges in oil-impregnated paper initially free from voids has been studied, and the main factor controlling the inception stress is now known to be the moisture content, although the mechanism through which this factor operates is not yet understood.

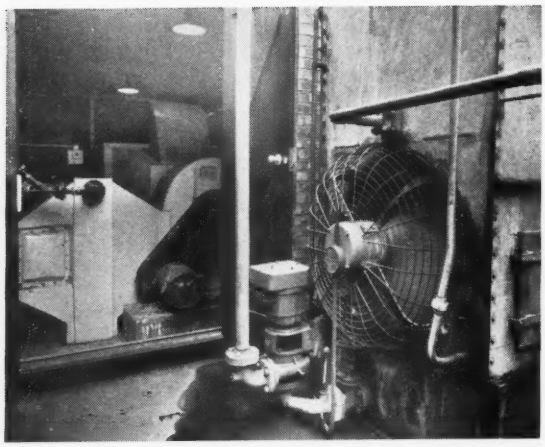
"This work has emphasised the need, already apparent for many years, of an intensive study of the mechanism by which small quantities of ionic impurities, such as moisture, produce such disproportionately deleterious effects on the electrical properties of insulation."

The above statement accentuates two very vital factors in the manufacture of impregnated paper dielectric capacitors. Experience over many years has shown that the drying of the paper dielectric and of the impregnating oil is exceedingly important, and all recent research has served to emphasise this importance.

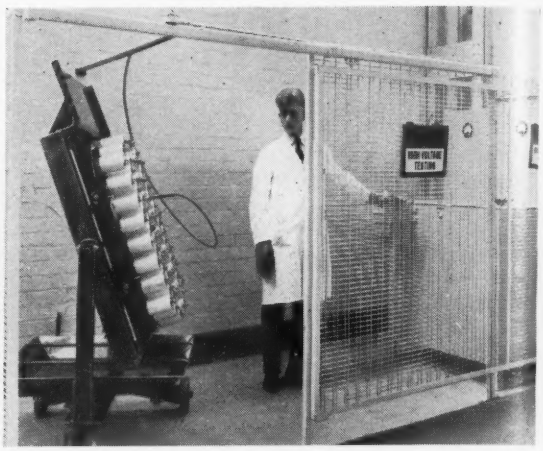
Coupled with this necessity of perfect drying of the paper and impregnant, is the equally important factor of avoiding all possible sources of contamination, particularly

The title picture shows the main processing shop, which is air conditioned. Below: Part of the winding shop where the air is filtered and temperature controlled





The air filtering, heating and cooling plant for the winding shop



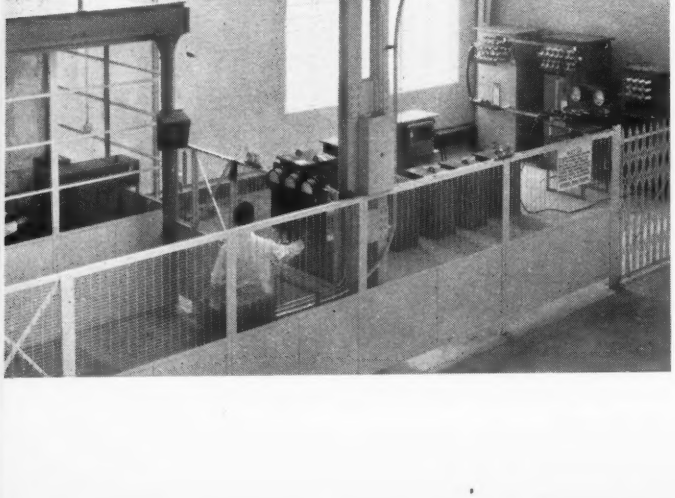
Flash testing individual elements

during the winding of the capacitor elements. Any traces of dust and grit trapped between the layers of tissue during the winding operation, and any contamination from perspiration, will result in the life of the capacitor being considerably reduced.

These strict manufacturing requirements are more important with capacitors than for any other equipments where impregnated paper dielectrics are involved, since with capacitors it is necessary to operate the dielectric at a high electrical stress in order to obtain a useful and economic kVAr output from a given bulk of material, and also because of the large area of dielectric which is continually under stress. It is with these requirements in mind that the new capacitor factory has been designed.

The room in which the elements are wound is fully air conditioned. The air is double filtered to remove all dust and other impurities from the atmosphere and then automatically warmed or cooled to maintain a constant temperature. The room is under a slight pressure so that there is a tendency for air to flow out of the room thus discouraging the ingress of dust. The walls are smooth enamelled and the floor is of polished hardwood, further assisting the maintenance of cleanliness. The processing shop is also air conditioned to ensure that there is neither dust nor any other form of contamination to come into contact with capacitor assemblies, or to enter the processing vessels when they are opened for loading and unloading.

A batch of capacitors in the main test bay



The wound elements are dried under vacuum to remove all traces of moisture and gas before the paper dielectric is impregnated, and the vacuum is not broken until the impregnation is completed. The impregnating oil is also dehydrated and degassed under vacuum in special vessels before use.

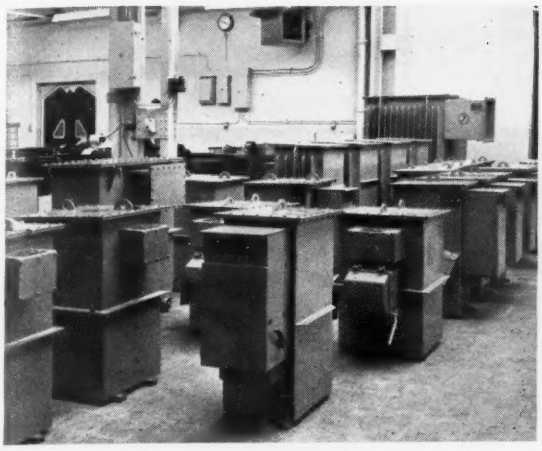
The pumping systems and the vessels of the processing plant are of entirely new design. By the use of booster pumps and oil-sealed rotary pumps directly connected to the vessels by 12in diameter trunking, the moisture content of the paper dielectric can be reduced to the lowest possible value. The processing vessels are heated by hot water in a jacket, circulating under pressure, which ensures a very uniform distribution of heat over the walls of the vessels. Furthermore, to maintain control and to ensure uniformity of the processing, the temperature of the walls of the vessels is controlled automatically to pre-set constant values, compressed air being used to operate the valves.

Automatic protective equipment is provided on all the pumping equipment, and in the event of a failure of the electricity supply or the cooling water which is required for the pumps, then the pumps are shut down safely and the processing vessel isolated and sealed so that the vacuum is maintained. Thus, there is no danger of damage to the capacitors which are being processed.

Each processing vessel has its own pumping equipment, and all the control equipment for the pumps, the electrically operated valves, and the protective equipment, together with the vacuum gauges, pyrometer indicators and the automatic temperature device for the vessel jacket are housed in a cubicle immediately behind each vessel and pumps. With this equipment the processing cycle can be accurately controlled throughout, so that the processing of each batch of capacitors is carried out with a high degree of uniformity and capacitors of consistently high quality are produced.

In order to prevent any atmospheric moisture entering the vessels and contaminating the product, only air specially dried to a very low dewpoint is allowed to enter the vessels when breaking the vacuum for unloading.

The impregnating oil is received in bulk and, after initial acceptance tests, is filtered and passed through primary and secondary dehydrating and degassing plant, maintained under vacuum, and finally transferred as



The dispatch bay

required, the vacuum being maintained, to the capacitor processing vessels. After processing, the elements are assembled into their frames in the conditioned atmosphere of the processing shop, and tanked. The basically-complete capacitor is then given a final vacuum treatment and immediately sealed.

All the tanks are received in the general shop and thoroughly cleaned before being passed to the processing shop. The various sub-assemblies are also prepared and pre-dried in an electrically heated oven before passing to the processing shop. On the other side of this shop the sealed capacitors are received from the processing shop for the mounting of the ancillary equipment, such as cable boxes, oil circuit-breakers, and air-break contactors, and for the final painting. To ensure freedom from corrosion during service, all tanks are previously shot-blasted, and if required for outdoor use they are metal-sprayed with aluminium before painting.

Test and Inspection

A comprehensive and rigorous system of testing covering material, sub-assembly and final assembly stages ensures the utmost reliability in every unit leaving the factory. Samples of oil are examined on receipt in a laboratory adjacent to the oil dehydrating plant, and further tests are made before the oil enters the processing vessels. In addition, constant checks are maintained on the composition and thickness of paper tissue and metal foil.

After processing, each element is flash-tested, and after assembly each capacitor undergoes the full series of tests specified in B.S. 1650 in a test bay in the processing shop. A Schering bridge enables the total losses in a complete capacitor to be measured under actual operating conditions at rated voltage. A further test bay is provided in the general shop for the final testing and inspecting of the complete equipment together with its control gear when fitted, to ensure that it is ready for commissioning when delivered to site.

The entire plant has been designed and installed under the direction of Mr. F. Moores, manager of the capacitor department. The processing plant was manufactured by Edwards High Vacuum, Ltd., and the air-conditioning plant by the Sturtevant Engineering Co., Ltd.

Large Walking Dragline

CLAIMED to be the largest in the world, a walking dragline weighing 1,675 tons and equipped with a 282ft long tubular steel jib has just begun work at an opencast ironstone quarry near Stamford operated by the Ore Mining Branch of the United Steel Companies, Ltd. The machine, which cost £800,000, is employed to strip the overburden from the ironstone, which is subsequently loaded by excavators and transported 75 miles by rail to the ironworks of the Appleby-Frodingham Steel Co. at Scunthorpe.

Taking 30-ton " bites " at the overburden, the W1400, as it is called, is expected to strip 20,000 tons of ironstone each week initially. The actual rate of stripping is, however, dependent on the thickness of the overburden, which at the Exton Park quarry will increase gradually to between 80 and 90ft, most of which is limestone. In these conditions, about 10,000 tons of ironstone will be stripped every week. The iron content of the ironstone at the 3,000-acre quarry is 30 per cent, and it is estimated that it will take about thirty years to work out.

Designed and built by Ransomes & Rapier, Ltd., the W1400 is electrically driven, all the electrical equipment being supplied by the British Thomson-Houston Co., Ltd. Power is taken from the mains at 6,600 V a.c. through a 3·7in diameter trailing cable to feed two 1,500 h.p. motor-generator sets. These sets in turn supply d.c. to the 14 main driving motors, each of 225 h.p. The machine is equipped with Ward-Leonard amplidyne control and all the electrical equipment is housed in a spacious motor room, which is serviced by a 25-ton overhead crane. The revolving superstructure is supported on a 48ft diameter circular base of structural steel which carries the main roller path, the rotate rack and the 2ft 4in diameter steel centre post.

The walking gear, which enables the W1400 to walk in a series of steps in any direction, has many special features to ensure the complete reliability of this important motion. There are two walking shoes, one on each side of the house, each 48ft long by 9ft 6in wide, carried on vertical legs which are driven by eccentrics. The walking operation is carried out by lifting and tilting the entire machine so that it slides across the ground to a new position, having made a step of 6ft 10½in. The weight of the machine is carried on hollow stub axles forming part of the bridge girder, thereby transmitting the weight of the machine direct to the superstructure and not through the driving machinery. The driving shafts, subject to torsional stresses only, pass through the axles to the eccentrics; these are fitted with rollers which run in machined paths in the legs. The connection to the shoes is by ball-and-socket joints, giving free movement for the shoes to accommodate uneven ground.

Hoist, drag and walk motions are each driven by four 225 h.p., 230 V, 415 r.p.m. separately excited shunt-wound heavy duty forced ventilated motors and are connected in pairs in series across each appropriate generator. The hoist and drag machinery consists of two complete winding units identical in design except for the grooving

of the winding barrels. Each unit is driven by four motors through balanced gear reductions to the main winding drum. The drag generators are switched over from the drag motors by a motor-operated drum change-over switch to the 225 h.p. d.c. walk motors. A geared 50 h.p., six-pole slipring induction motor is used to lower and hoist the 282ft boom. B.T.H. " Stacreep " control is fitted to give the fine adjustment needed, and a steady speed of 15 per cent of full load speed can be obtained by this method.

The Ward-Leonard system is employed with amplidyne control on all motions with a further amplidyne system to correct the power factor on the synchronous motor. Electro-magnetic brakes are provided on each driving motor; these act only in an emergency and are applied automatically in the event of a power failure. Normally, all braking is effected by regenerative control. The maximum pull on each winding barrel is 100 tons and the rope speeds range from 290 ft/min at normal full load to 513 ft/min at no load.

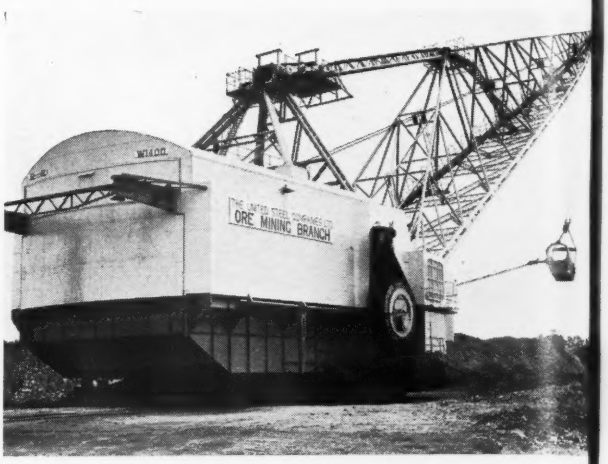
The rotate motion is driven by two gear units, each with its own 225 h.p. vertical motor. The rotating speed is at the rate of $1\frac{1}{4}$ r.p.m., which gives a jib head speed of 2,000 ft/min or nearly 23 m.p.h. The torque about the centre post reaches a maximum of 7,032,000 lb-ft. It takes approximately one minute to complete a cycle of digging, slewing, dumping and returning the machine to its original position.

The great jib is of all-tubular welded construction, triangular in section, with two double tube compression members and one double tube tension member. A tubular structural suspension member connects the jib through safety links to the head of the " A " frame, but the jib may be lowered to the horizontal position, for which purpose a jib hoist winch operating ten parts of rope is fitted. In normal working order, the jib is supported by a tubular steel suspension member and is not dependent on jib hoist ropes except for adjustment to the working angle and for lowering to ground level. The drag bucket, which weighs 22 tons, is of 20 cu yd capacity and is of all-welded construction with renewable teeth.

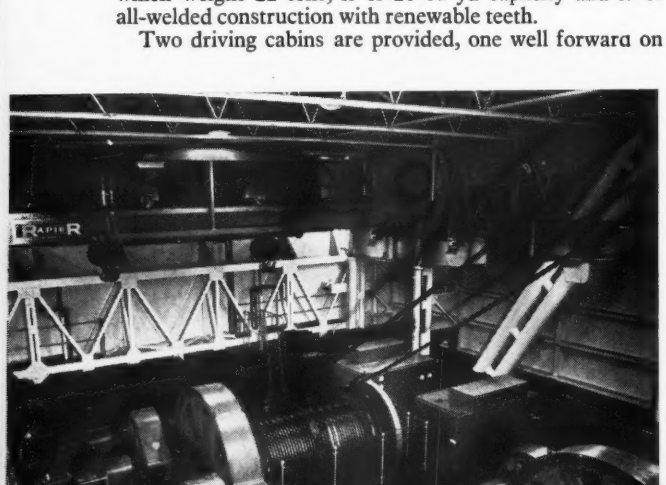
Two driving cabins are provided, one well forward on each side of the machine so that the driver may occupy whichever gives the better vision for the work in hand. The controls of the excavator have been brought together in a console so that one man can control the complete machine. This console is fitted with three master controllers, one for each motion; switches are fitted for the emergency brakes and drag/walk change-over.

The master controllers on the console operate the control fields of the amplidynes which are fitted with an adjustable compensating winding to provide feedback to give a forcing effect on the generator field. The controls are arranged so that the amplidynes are " suicided " to prevent large circulating currents when the controllers are in the " off " position and the motors are stationary. To prevent instability of the amplidyne system a further field on the amplidyne is connected to stabilising transformers which prevent the rate of change of current becoming excessive.

The whole superstructure house is pressurised by means of air filtering and fan equipment which serves the dual purpose of ensuring an ample supply of cool air for the electrical equipment and preventing the admission of dust. Passages with airlocks are provided for access to the various parts of the machine.



General view of dragline in operation



Motor room, showing four 225 h.p. motors geared to the hoist rope winding barrel. A similar group of motors drive the drag rope barrel, which is partly visible in the foreground

New Element Discovered

A JOINT research effort by scientists from Sweden, Great Britain and the United States has led to the discovery of element 102. The new element was produced by bombarding curium, which is element 96, with carbon ions accelerated in the 225 cm cyclotron at the Nobel Institute, Stockholm. Radioactive atoms were first observed and isolated on 23rd March, and tentatively assigned to element 102. Subsequent work has confirmed the discovery.

The sequence of known elements standing beyond uranium in the atomic table is now: neptunium (element 93), plutonium (94), americium (95), curium (96), berkelium (97), californium (98), einsteinium (99), fermium (100), mendelevium (101) and the new element. None of this series of elements has been found to exist in any significant amount in nature and all of them were made artificially for the first time by irradiating the lower elements. Element 102 is the first to be discovered in Europe, the remainder all having been discovered in the United States. The new element was identified by radio-chemical methods; the isotope identified had a half-life of about 10 minutes and emitted alpha particles with 8·5 MeV energy. It probably has a mass of 253.

Delegates listening to the simultaneous translation of speeches at the opening session in the Great Hall of the Lomonosov University

International Standardisation

Deliberations of the I.E.C. Working Committees in Moscow

BY A SPECIAL CORRESPONDENT

WITHIN a stone's throw of the Kremlin and at a corner of Red Square stands the Moskva Hotel which served as the domestic headquarters of some two hundred "foreign" delegates attending the meetings of the committees of the International Electrotechnical Commission from 2nd to 13th July. The business headquarters were on the 18th floor of the newly-built Lomonosov University situated on the Lenin Hills overlooking Moscow from the south-west. Transport between the hotel and the university, a distance of five miles, was by means of a ferry service of special buses, and this provided a good opportunity for the delegates to appreciate the vast scale on which Moscow has almost entirely been replanned and rebuilt since 1935. And the work is still going on; for instance, near the university, an entirely new section of the city, to house half a million people in massive blocks of flats, is springing up, the numerous tall cranes giving the impression, from a distance, that the skyline is one huge shipyard.

The 200 visiting delegates came from twenty-three countries, and in addition about 100 delegates from the U.S.S.R. itself participated in the technical sessions. The largest foreign delegation was that from the United Kingdom (52) led by Mr. B. H. Leeson, C.B.E. (chairman of the British National Committee), and Mr. H. A. R. Binney, C.B. (director of the British Standards Institution). The delegation was organised by the B.S.I. and was composed of representatives of manufacturers, consultants, the Central Electricity Authority and Area Boards, the British Transport Commission and the National Physical Laboratory.

Fifteen technical committees, engaged on various aspects of standardisation in the field of electrical equipment, held meetings, some of which lasted for one or two days only, while one sat almost continuously throughout the fortnight. The result of all this activity was that the Committee of Action was able to authorise the immediate publication of five documents, the circulation for comment of 21 documents and the circulation of one document for final approval.

The opening meeting, in general assembly, took place in the Great Hall of the University, when the delegates were welcomed by Mr. A. S. Pavlenko, Deputy Minister in charge of power stations and chairman of the organising committee responsible for the arrangements for the I.E.C. meetings in Moscow. It was with much interest that the delegates learned a day or two later that Mr. Pavlenko had suddenly replaced Mr. Malenkov as Minister. Mr. Pavlenko was present at most of the receptions and other official functions which were held during the period of the meetings.

Committee of Action

This committee, which is in effect the Executive Committee of the Council, met under the chairmanship of Dr. P. Dunsheath, C.B.E., President of the I.E.C. One of the first items dealt with was the question of finance. It was seen from the accounts for the year 1956 that the total income amounted to nearly 270,000 Swiss francs, and that expenditure exceeded income to the tune of 25,000 Swiss francs. Since the closing of these accounts the contributions from the National Committees have been increased by 50 per cent. The treasurer (Dr. A. Roth, Switzerland) was not present, but he had submitted a report showing that during the first six months of 1957 expenditure had been kept within the limits fixed in the budget. If the work of the I.E.C. was to continue at its present rate further income would have to be sought, and he hoped that for the next few years at least this could be achieved by increased sales of publications. The treasurer made certain suggestions with a view to achieving economies, particularly in connection with the reproduction of I.E.C. publications.

It was agreed that the Charles le Maistre Memorial

Lecture for 1958 should be given by Dr. R. Vieweg (Germany). The lecture for 1957 was given in Moscow by Professor R. O. Kapp, and is referred to again later in this report.

The Committee confirmed its acceptance of the invitation from Sweden for the I.E.C. meetings in 1958 to be held in Stockholm during the period 8th to 16th July, and it was provisionally agreed to accept the invitation from Spain for the 1959 meetings to be held in Madrid. An invitation from India to hold meetings in that country at an early date was noted with pleasure, and will be discussed again next year.

Considerable discussion arose regarding the use of the Russian language in I.E.C. publications. At present all I.E.C. publications are issued by the Central Office in English and French, the two texts usually being given side by side in the same volume, while Russian translations are issued by the U.S.S.R. National Committee. The U.S.S.R. delegation proposed that the Russian editions of I.E.C. publications should be issued by the Central Office and that all three languages should have equal status.

One suggestion was that the English, French and Russian texts should be printed as separate editions, each to be sold at the same price. Many of the delegates urged, however, that the present practice of combining the English and French texts in a single volume should be continued on the grounds that in some countries some people preferred to consult the English text, while others could with greater facility follow the French text.

The final decision of the Committee of Action was that all I.E.C. publications should, in future, be issued in two separate booklets, one containing the English and French texts, and the other containing the English and Russian texts. The U.S.S.R. Committee undertook to purchase a minimum of 150 copies of the English/Russian editions, and it was hoped that by this means the additional cost of printing the Russian text would be offset.

Nuclear Energy Discussions

On the subject of nuclear energy Mr. P. Ailleret (France) recalled that a joint I.E.C./I.S.O. statement had been sent to the United Nations in July, 1956, indicating that these two organisations intended to establish a programme of work in the field of nuclear energy. Various suggestions had been made by the National Committees of the I.E.C. regarding items which should be included in the programme of work, including electrical measuring instruments for nuclear reactors, electrical components of servo-mechanisms, and instruments employed in the use of radio-isotopes.

Attention was drawn to the fact that the International Organisation for Standardisation (I.S.O.) had authorised the setting up of a technical committee on nuclear energy, the first meeting of which would be held in Geneva this summer. It was agreed that before drawing up a programme of work to be undertaken by the I.E.C., the whole field of standards relating to the use of nuclear energy should be reviewed by the I.S.O. Committee, and it was agreed that the I.E.C. should be represented at the forthcoming I.S.O. meeting by Mr. Ailleret, Dr. Vieweg (Germany) and Mr. Binney (United Kingdom). It was further agreed that these three gentlemen, together with representatives to be appointed by the United States and the U.S.S.R. National Committees, should constitute a steering committee to maintain liaison with the I.S.O. and to make recommendations to the Committee of Action regarding a programme of work in this field.

Consideration was given to a proposal submitted by the United Kingdom that there should be a greater degree of uniformity in the setting out of the titles of I.E.C. publications. At present some publications are called Specifications, while others are called I.E.C. Specifications, Recommendations, I.E.C. Recommendations, or Reports. It was agreed that in future all publications should be given the heading "I.E.C. Recommendation" or "I.E.C. Report" and that in the sub-title the word "specification" without further qualification should be avoided as far as possible, as it was insufficiently indicative of the nature of the document.

It was decided to set up new committees to deal with the following subjects:—Fans, other than industrial type (Secretariat, India); electronic instruments (Secretariat, U.S.S.R.); electrical equipment of machine tools (Secretariat, Switzerland); and welding equipment (Secretariat, United Kingdom).

Machine Tool and Welding Equipment

The decision to set up committees dealing with the electrical equipment of machine tools and with welding equipment arose out of a report submitted by Mr. Binney (United Kingdom) as chairman of the Sub-Committee on Safety Regulations. In his report he pointed out that while some items of equipment used on machine tools, e.g. contactors, were already being dealt with by the Sub-Committee on Low-Voltage Switchgear, there were very many items of equipment which did not at present fall within the scope of any existing committee. It was agreed that the new committee should work in close collaboration with the I.S.O. Technical Committee on Machine Tools. As regards welding equipment Mr. Binney recalled that there was already an I.S.O. committee dealing with various technical aspects of welding equipment, but the I.E.C. was particularly concerned with the safety aspect. It was agreed that the I.E.C. should set up a working group to maintain liaison with the I.S.O. committee with a view to ensuring that safety requirements were adequately dealt with.

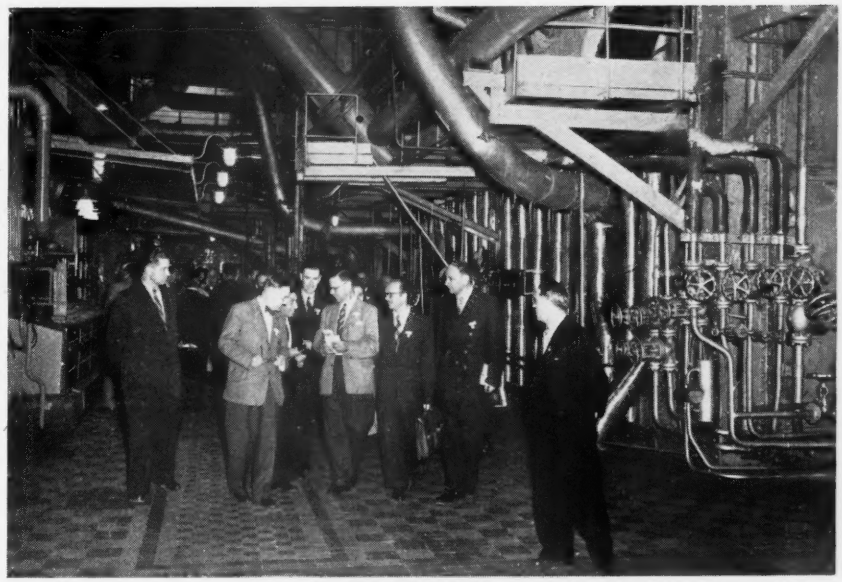
The Sub-Committee on Safety Regulations also recommended that the safety requirements for X-ray equipment should be dealt with, but that before setting up a subcommittee for this purpose liaison should be established with the International Radiological Congress, after which the sub-committee would report on the need for I.E.C. activity in this field.

A suggestion had been made by Canada that the work of the I.E.C. Technical Committee on Internal Combustion Engines should be transferred to the I.S.O. since the subject was more concerned with mechanical engineering than electrical. This proposal was opposed by some delegations, who pointed out that the I.E.C. work related to the characteristics of internal combustion engines designed specifically as prime movers for electrical generators. The decision of the Committee of Action was that the work should remain in the hands of the I.E.C., but that the scope of the work should be reported to the I.S.O. Technical Committee on Internal Combustion Engines and that full liaison should be established.

Consideration was given to some proposals submitted by the United Kingdom for elucidating the directives regarding the application of the six months' rule and the two months' procedure for the approval of draft I.E.C. documents. Under these directives National Committees are asked to vote for or against the acceptance of documents as I.E.C. recommendations, but experience has shown that the votes cast by the National Committees are, in many cases, accompanied by comments which are so phrased as to leave some doubt as to whether the vote is an affirmative or negative one. The United Kingdom proposals were designed to ensure that all votes were

cast and comments submitted in such a way as to leave no doubt as to whether an affirmative vote was dependent or not on the comments being accepted.

It should perhaps be explained here that a document is not circulated under the six months' rule until it has been fully discussed by the relevant technical committee, consequently all points raised during discussion in committee have either been accepted or rejected before the preparation of the document on which voting is to take place. It was therefore hoped at the time when the six months' rule was introduced, many years ago, that additional comments would not be submitted by the National Committees at the voting stage; but in practice, comments are very often submitted and the responsibility for deciding how to deal with the comments rests with the chairman of the appropriate technical committee. The United Kingdom proposals were designed to give assistance to the chairman in deciding on how to deal with the comments. After some discussion the proposals were agreed to. The Committee of Action also approved some draft directives dealing with the procedure to be adopted when dealing with subjects, e.g. terminal markings, which are of direct concern to two or more different committees. The I.E.C. Secretariat will now prepare a new draft of the rules of procedure.



Delegates on a visit to the No. 11 thermal power station in the Moscow area

The final subject discussed by the Committee of Action was the thorny one of registration fees to be paid by delegates participating in I.E.C. meetings. A proposal that consideration be given to this matter was made by Dr. H. Osborne (U.S.A., Past-President of the I.E.C.), who drew attention to the growing number of delegates participating in meetings and to the consequential ever-increasing cost falling on the host country. He pointed out that some of the smaller countries had difficulty in raising funds to meet the expenses involved in organising an I.E.C. meeting, and although he realised that there were objections to the idea of registration fees he thought the matter should be carefully looked into. It was agreed that this matter should be referred to the President's Preparatory Committee for consideration.

Work of the Technical Committees

Rotating Electrical Machinery. The principal matter discussed was a revision of the table of temperature rises at present appearing in the I.E.C. Rules for Motors and Generators. The table has remained unchanged for many years, but the introduction of new classes of insulating material has made a revision a matter of urgency. The U.S. delegation put forward the proposal that separate tables of temperature rises should be given for each type of machine, as is now done in the American rules, but it was decided that such a drastic revision could not be agreed upon without further discussion within the National Committees. This would involve considerable delay, and it was therefore decided to retain for the time being a general table together with a separate table for hydrogen-cooled generators. A new table will now be circulated under the six months' rule. Several minor matters relating to the I.E.C. Rules were also agreed for circulation under the six months' rule, including new requirements regarding rating plates of machines.

A working group was set up to study further the question of waveform irregularities. A Secretariat proposal gave rise to various comments, and it is hoped that these can be dealt with by the working group by correspondence.

One of the most important sub-committees of the Technical Committee on Rotating Electrical Machinery is that dealing with dimensions of motors. This sub-committee did not meet in Moscow, but it was reported that good progress had been made by a working group and that a meeting of the full sub-committee would be held in the autumn. It is hoped that as a result of that meeting a proposal for a single series of motor frame sizes (as distinct from the two series at present given in I.E.C. Publication 72) can be circulated under the six months' rule.

Electric Traction Equipment. A meeting of this committee was immediately followed by a meeting of the "Mixed Committee" consisting of representatives of the I.E.C. and of the International Union of Railways (U.I.C.). The latter committee endorsed the recommendations of the former, with the result that rules for auxiliary machines on motor vehicles and rules for electric transmissions of diesel-electric vehicles will now go forward for publication.

Steps were agreed upon for speeding up the work on the revision of I.E.C. Publication 48, Rules for Traction Motors, the main object of the revision being to extend the rules to cover certain other classes of equipment.

Another document discussed was a draft presented by the U.I.C. dealing with rules for the testing of electric rolling stock on completion of construction and before being put into service. The I.E.C. Committee suggested a number of modifications, and these will be considered by the U.I.C. in preparation for a further meeting of the "Mixed Committee" which is to be held in 1959.

Switchgear and Control Gear. A meeting of this technical committee was preceded by meetings of its two sub-committees dealing with high-voltage and low-voltage equipment respectively. As the result of the first sub-committee's work the following documents are now ready for circulation under the six months' rule:—

Rules for selection of circuit-breakers for service (to become Chapter 4 of I.E.C. Publication 56, Rules for Circuit-Breakers).

Rules for erection and maintenance of circuit-breakers (to become Chapter 5 of Publication 56).

Measurement of the inherent restriking voltage.

Although the second sub-committee made good progress on draft rules for low-voltage circuit-breakers and contactors, a further meeting will be necessary before the drafts can be circulated under the six months' rule.

Electric Cables. Up to the present this committee has been dealing with the question of the testing of paper-insulated cables. It has now been agreed to extend the scope of the work to cover accessories and at the Moscow meeting consideration was given to a document prepared by the Secretariat (United Kingdom) on the testing of accessories for oil-filled cables. This was considered in conjunction with a specification for tests on the cables themselves, and a new document combining the two drafts will now be circulated for approval under the six months' rule.

The Secretariat had prepared corresponding proposals for tests on gas-pressure cables and accessories for voltages up to 275 kV, but time did not permit of these proposals being discussed in detail in Moscow. Consequently a working group was set up with the object of reviewing the comments received from the National Committees and preparing a new draft for consideration at the next meeting of the full committee.

Power Converting Equipment. This committee is dealing with power rectifiers, and it was reported that the I.E.C. Recommendations for mercury-arc rectifiers, which had been under discussion for several years past, had just been published by the Central Office. The committee is now devoting its attention to monocrystalline and polycrystalline semi-conductor rectifiers.

Good progress was made with the draft for polycrystalline (copper oxide and selenium) rectifiers, considerable assistance having been given by working groups who submitted reports on power loss measurements and on ripple voltage measurements from the standpoint of telephone interference. A comprehensive draft will now be prepared and circulated under the six months' rule.

Several sessions were devoted to the discussion of a draft on monocrystalline (germanium) rectifiers, but a further meeting will be necessary before a document can be circulated under the six months' rule.

Lamps and Related Equipment. A meeting of this technical committee was preceded by meetings of three sub-committees, as a result of which the following documents are now ready for circulation under the six months' rule:—

(1) Amendments to I.E.C. Publication 64, Tungsten Filament Lamps.

(2) Proposals for a revision of Publication 61, Lamp Caps and Holders.

(3) Amendments to Publication 82, Ballasts for Fluorescent Lamps.

(4) Standard Sheets for Pre-Focus Screw-Type Caps (EP 10) and for Bayonet-Type Automobile Caps (BAY 15).

It is expected that, subject to a postal ballot by one of the sub-committees, amendments to Publication 81, Tubular Fluorescent Lamps, will shortly be ready for circulation under the six months' rule.

Perhaps the most important item dealt with at the Moscow meeting was the question of gauges for E.27 and E.40 lampholders. This has been a very controversial subject for many years, some countries requiring that the lamp caps shall be " untouchable " while the lamp is being inserted or withdrawn from the holder. Owing to the existence of caps of lengths varying between 25 and 30 mm, this requirement has been very difficult to meet. Other countries have required only that the caps shall be untouchable when the lamp is fully inserted in the holder. Agreement has now been reached on a set of gauges which will provide for the latter requirement, together with a gauge which may be used by those countries (very few in number) who still insist upon the more onerous equipment.

Preliminary consideration was given to the setting up of machinery on an international basis before assigning code designations to projector lamps. Such a scheme is at present in operation in the U.S.A. and it was generally agreed that it would be useful if this scheme could be extended on a world-wide basis. The basis of the scheme is that the manufacturers of projector lamps submit details of the characteristics of the lamps to a central authority, and a three-letter designation is then assigned by the central authority to each lamp if its characteristics differ from those of a lamp which has already been coded. If the characteristics are the same as those of a lamp already registered, the same code designation is assigned. In this way the user can be assured that any lamp bearing the same designation will be interchangeable.

The administration of a scheme of this sort has not so far been included within the activities of the I.E.C. as such, and the matter was therefore referred to the Committee of Action for policy guidance. The Committee of Action will therefore study the matter and

Meeting of the Technical Committee on Cables

come to a decision at their next meeting. Amongst the other work at present in hand may be mentioned the question of automobile lamps, a subject which will be dealt with in close liaison with the I.S.O. Technical Committee on Automobiles, and the question of the selection of test lamps for use in connection with heating tests of lighting fittings. This latter subject is being dealt with at the request of the International Commission on Rules for the Approval of Electrical Equipment (the C.E.E.).

Primary Cells and Batteries. This committee considered the results of tests carried out by the National Committees to determine the service outputs of combined batteries, radio high-tension batteries, batteries for transistorised hearing aids, mercury batteries and portable lighting batteries. As a result of a comparison of these tests, agreement was reached on values to be standardised for rated outputs, and these will be circulated for approval.

The practicability of laying down standards for batteries for transistorised radio sets was discussed, and many difficulties were encountered. It was felt, however, that owing to the rapid development of transistorised equipment standards for batteries should not be unduly delayed, and proposals relating to three alternative types of battery will be circulated to the National Committees for comment.

Bushing Insulators. A specification for bushing insulators for voltages above 1 kV was circulated under the six months' rule some months ago. The comments received from the National Committees were reviewed in Moscow and an amended draft will now be circulated for final approval under the two months' procedure.

Lightning Arrestors. No meeting of the full technical committee on lightning arrestors was held in Moscow, but a small panel of experts met to discuss a draft specification for expulsion-type arrestors. The Secretariat will now be able to draw up a revised draft for circulation to the National Committees for comment.

Charles le Maistre Memorial Lecture

The lecture was given this year by Professor R. O. Kapp, who took as his subject " The National Acceptance of International Standards." The lecture was delivered in the Great Hall of the University and was simultaneously translated into French and Russian.

One of the qualities possessed by Charles le Maistre, said the lecturer, was a highly developed sense of relevance. This trait is not always listed among the essential qualities of a good committee man, and its value is often under-rated.

A sense of relevance permeates the deliberations of the I.E.C. and gives its recommendations their value. The importance of this sense seems to be under-rated by philosophers and moralists. One may search the textbooks in vain for help or guidance in mastering the technique of testing for relevance. " This omission serves largely," continued Professor Kapp, " to explain the many warring philosophies, the proliferation of rival ' isms.' Most of these cease to be plausible as soon as one notices that certain facts of relevance have been ignored."

Pushing home his point, Professor Kapp asserted that " no one would deny that truth and justice must be served punctiliously; but although the modest goddess Sense of Relevance may arouse the jealousy of her more resplendent sisters the I.E.C. has always known that her shrine, too, must be tended. A standard specification could be perfectly logical, comprehensive, clear, attractively worded, constructed in the most methodical manner; but it would still be useless if it had not been prepared with a due sense of what is relevant to the situation."

In international standardisation the relevant facts are numerous and complex; many of them are, of course, scientific, and it is not likely that any relevant *scientific* fact would be overlooked by an I.E.C. committee. But standardisation cannot be achieved in an atmosphere of pure abstract science. Sundry non-technical obstacles must be surmounted and this can only be done by a realistic approach. A committee may, for example, find that a decision within its own terms of reference has already been reached elsewhere, in some other I.E.C. committee or by some other international organisation. It is often found that " nothing more than consistency has been at stake. A minor example will illustrate this. The official policy of the I.E.C. is to express quantities in M.K.S. units. But it has been found that some of its publications are better if they ignore this and use c.g.s. units. Engineers are not pedants and they sometimes find it wise to defy that tyrannical goddess Consistency."

The occasions are quite rare when engineering practice so commits the future that standardisation is thereby handicapped. Designs are soon superseded and what *is* turns into what *has been*. As a rule the *what ought to be* can appear in an I.E.C. standard without reservation.

After outlining other aspects of the philosophy of international standardisation and quoting examples of their application, Professor Kapp concluded by saying:— " The long-established traditions of the I.E.C. are an asset of incalculable value. They permit a degree of informality in its proceedings that would not be appropriate in a newer organisation, and this informality enables delegates to be frank without giving offence, to tell their fellows not only what opinions they hold but also the strength with which they hold those opinions, to discover from each other the various reasons that determine the line that they have to take, reasons that can often not properly figure in a formal record of proceedings. In short, the traditions of informality in the I.E.C. are the best safeguard against the danger that a problem may be isolated from its past history, from its background, as may easily happen in an over-formal atmosphere. These traditions engender loyalty and mutual trust among the delegates, and when there are these there is also effective concerted action. In the tasks that have become the responsibility of the I.E.C. this concerted action is immensely worth while; it ensures that in the field of electrical engineering human effort will be well directed."

Technical Visits

Among the numerous visits of technical interest organised for the benefit of the delegates the following were of particular interest:—

Thermal power stations Nos. 11 and 20 in the Moscow area, both of which provide district heating; the Moscabel cable works; section of the electrified railway between Moscow and Paveletz; 400 kV sub-station at Norguinsk, which feeds energy from the Stalingrad hydro-electric station to the Moscow district; and the Moscow television centre.

During a two-day excursion to Leningrad visits were paid to the D.C. Research Institute, the Electrosile factory where heavy electrical plant is manufactured, and the Svetlana radio valve factory.

During an excursion to Zaporoshie the Dnieper hydro-electric station was the chief item of interest. There were also many visits of a less technical nature.

At a farewell reception the President, Dr. Dunsheath, and other speakers expressed the appreciation of all the delegates for the lavish hospitality extended to them and for the excellent arrangements made for the conduct of the business sessions.

Accidents in the Home

THE Home Office has issued a summary of the electrical accidents in domestic and similar premises notified during 1956, and in view of the lessons to be learned we publish below brief notes relating to a number of these accidents.

Two fatalities occurred owing to the accidental displacement of brushes in portable electric drills resulting in the metalwork becoming charged. In both cases the drills were connected to the system by twin-core cable without an earth wire.

Several fatal accidents involved the use of domestic electric flat irons. In two cases, fragile plastic adaptor-type sockets on the irons were broken, exposing live terminals, due to children pulling the iron on to the floor. In another instance a new iron supplied with a length of 3-core t.r.s. cable was connected by merely inserting the tail-ends into the contact tubes of the wall socket and wedging them with matchsticks. The earth core was in error inserted in the live tube with the result that a person taking hold of the iron was killed.

A woman was fatally injured whilst using an electric cleaner when she handled with her free hand a metal table lamp. The lamp was alive through a faulty switch. Another, standing with bare feet on a wet tiled floor, was electrocuted whilst using an electric iron. An intermittent line to frame fault had occurred in the iron, and this had charged the non-earthed metalwork at mains voltage. The fault was caused by defective wiring which had been installed by an amateur.

Portable Lamp Hazards

When he took a non-earthed metal table lamp into a cupboard to provide illumination for a job he was doing a man received a fatal shock. The lamp was connected to the system by a t.r.s. flexible cable and a two-pole bayonet-cap adaptor inserted into a pendant lampholder.

A workman, engaged on erecting a cold store at the rear of a butcher's shop, had been using a temporary lamp connected to the system by means of a flexible cable and two-pole bayonet cap adaptor inserted into a lampholder in the shop. An employee of the butcher was fatally injured when he took hold of the adaptor. The insulation had broken around the fitting, exposing live metal parts.

A woman received a fatal shock when she tried to repair her electric iron. She received a hand-to-hand shock when attempting to open one of the contact tubes in the adaptor with a metal tin-opener. A soldier met his death whilst sitting on a metal bed repairing a mains radio set. While a meter-fixer was replacing meters in a private dwelling house the sealing wire which he was holding in his left hand came into contact with the earthed metal case of the meter and he received a fatal shock.

A baby, crawling on the concrete floor of a kitchen, came into contact with the accidentally-charged metalwork of a domestic electric boiler and received a fatal shock. The boiler, although not in use at the time, was plugged into a wall-socket. The earth wire had become detached inside the wall-socket and had come into contact with the live phase terminal. An eleven-month-old baby bit through the insulation of a cable connecting an electric fire to the system and was killed. The child had only been left alone for a few minutes.

Bathroom Accidents

A man was electrocuted in a bath when handling a mains portable radio set connected to the wiring system by a length of flexible cable and a bayonet-cap adaptor inserted into a pendant lampholder. One of the main conductors had become accidentally disconnected and touched his hand. A woman was the victim in another bathroom accident in which an improvised boiling ring used for space heating fell from a small table into a bath. The appliance was very dangerous. In another case a child died when it accidentally came into contact with the exposed terminals of an immersion heater in a bathroom. A youth was killed whilst bathing when he touched a defective electric record player which had been placed on a stool beside the bath.

A woman, about to take a bath, was killed when she stepped into the water whilst her hand was resting upon an electric boiler standing on a table at the foot of the bath. The metalwork of the boiler had been bonded to the neutral conductor and the tumbler switch controlling the circuit was connected in the neutral conductor. A woman was found dead, submerged in a bath of water, and her husband was also found dead on the floor beside the bath. They had both received fatal electric shocks from a home-made electric bowl-fire, which had been supported from the door frame by a screw hook.

A woman slipped whilst standing in a bath full of water and to save herself from falling she caught hold of an asbestos insulated cable connected to an electric immersion heater in a cupboard at the foot of the bath, with fatal consequences. The asbestos insulation of the cable had absorbed moisture and was very damp. A man received a fatal shock from the hot water tap whilst having a bath. It was found that a lead sheathed cable running from a plastic junction box underneath the floor boards of the bathroom had been damaged, with the result that the non-earthed sheath touched the live phase conductor and became electrically charged. This in turn charged a copper hot water pipe with which it came in contact, thus making the tap "live" at 230 V a.c.

A man met his death when using an electrically operated water pump in a hut in a market garden. The 3-core cable supplying the pump was found to be defective in that the earth core had become detached inside the plug top and came into contact with the live phase conductor. An apprentice received a severe electric shock which proved fatal when the non-earthed metalwork of an electric hair cutter, which he was holding in his hands, became accidentally electrically charged at 240 V a.c. owing to an insulation defect in the cutter.

Professional Appointments Bureau

THE Professional Engineers' Appointments Bureau, 9, Victoria Street, S.W.1, says in its report for 1956 that there is continued evidence of the unabated demand for technological manpower. An increasing number of Canadian and American firms are using the Bureau's services; they generally require men with specialised experience. More people are seeking positions in Canada, the Rhodesias and other Commonwealth countries and the Bureau emphasises the importance of increasing training in this country to a point where the supply of young engineers can keep pace with the expansion of engineering at home and overseas.

Although the number of engineers registering with the Bureau decreased, those placed in 1956 increased. The number of vacancies notified did not fluctuate appreciably, but a larger proportion was for senior administrative posts. The more senior appointments now attract a reasonable selection of qualified applicants, which suggests that larger numbers of more experienced engineers are considering changing their posts than a year ago. Average salaries of successful placings were higher than for previous years, and it is now difficult to find sufficient candidates from those registered who are seeking salaries much below £800 per annum; in past years it was relatively simple to fill the junior posts.

The Registrar states that he is always glad to offer the facilities of the Bureau to corporate members, graduates and students of the three principal engineering Institutions who are contemplating a change of post, and to any employer who wishes to fill a vacancy.

VIEWS on the NEWS

By REFLECTOR

WHEN the Postmaster General announced the higher charges which his Department is to introduce next October he was asked whether there was not scope for further economy in man-power by means of mechanisation. In his reply he pointed out that much had already been done, but "no electronic machine yet invented would walk down a drive and deliver the letters." I was glad to see that the *Manchester Guardian* took this point up when commenting on the increases. It said:—

> "And why must telephone charges be increased so heavily with postal rates? Telecommunications are the mechanised alternative to manually delivered letters, and the use of more and more automatic exchanges should enable some charges to be reduced. The Post Office should try to encourage telephone traffic, not deter it by new imposts."

* * *

The *Economist* has made a study of the possible openings for officers of the three Services who are being retired as a result of the Government's revised defence plans. Some of them, of course, have acquired qualifications in the Services which fit them for similar civilian jobs. Others seek administrative posts, with middling success, and some are getting into industry as draughtsmen. The article goes on:—

> "Most surprising of all, officers are finding they can be modern salesmen. Not in selling vacuum cleaners from door to door at one extreme, or selling hydro-electric plant from government to government (which engineers must do) at the other, but inbetween. . . . There is a lot of salesmanship in service life."

* * *

One of the duties sometimes imposed upon electricity authorities when developing hydro-electric resources is the maintenance of fisheries. Over the last two years this side of its activities has involved the Electricity Supply Board, Dublin, in a loss of nearly £20,000, but some improvement may result from the latest application of the Board's main product, electricity. Experiments have been carried out in which salmon caught in traps are instantaneously killed by an electric current. The Board states that the fish have subsequently been shown to remain fresh for an exceptionally long period and in general they command a higher price than salmon killed by the normal method of clubbing.

* * *

My recent note on the trouble at Bath seventy years ago over the introduction of electric light into the city has drawn a letter from Mr. Harry Moss, M.I.E.E., of Bradford, who tells of similar difficulties at Alfreton, Derbyshire, of which he himself had experience. He says:—

> "Various Urban District Councils in the area opposed the scheme and, as I mentioned in a letter I wrote to the local newspaper in February, 1898, I believe the opposition was brought about because the local councillors were shareholders in the gas undertakings. In my letter I said, 'It would give private householders a chance of having a much cleaner and healthier light for their residences. Shopkeepers would be able to use it to great advantage and it is to be hoped it will come within the reach of the working classes.' Yes, a vision of fifty-nine years ago, and I have been fortunate enough to live to see it all materialise and to have been actively engaged in the great transformation.
>
> "Many of the present day engineers know little or nothing of the pioneering work some of we older ones took part in. When current was being sold at 6d a unit by public supply authorities in about 1900 I was busy installing gas engine driven private plants for shop lighting and as carbon filament lamps were then available it was customary to use enclosed arc lamps both inside and outside the shops.
>
> "I look back with pride and pleasure on what I have witnessed and taken part in."

* * *

Birds are frequently the cause of power failures. Generally they do not live to learn the error of their ways, but an experienced member of the avian species was obviously responsible for a recent supply cut at Ilkeston. This wily bird, the local paper says, dropped a piece of copper wire into the switchbox.

* * *

One has to be cautious in references to what used to be called our "Sister Isle." In my notes of 5th July there was a paragraph on early electric traction schemes in which Portrush, Ireland, was mentioned. A Belfast reader insists that I should have said "Northern Ireland" because Portrush is in one of the Six Counties. He says that "Ireland is the appellation of the Southern 26 counties and is applied in a political sense." He has been rather hasty for at the date referred to, 1857, there was only one Ireland and so I stand by my term.

* * *

Considerable space was devoted in the *Electrical Review* of 29th July, 1887, to the jubilee of the successful establishment fifty years earlier of Cooke and Wheatstone's telegraph line between Euston Station and Camden Town. The Postmaster General, the Right Hon. H. C. Raikes, presided at a commemorative dinner held at the Holborn Restaurant, the *Review* report of which extended to more than 12,000 words. In the course of the toast which he proposed the Postmaster General said that the occasion which brought them together was to celebrate "perhaps the greatest scientific discovery in its applied form that has ever come to improve the lot of man." The speakers included Sir William Thomson (later Lord Kelvin) who recalled the names of Oersted, Ampère, Gauss and Weber, and others as deserving to be honoured.

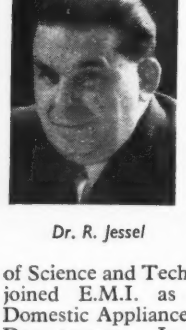
PERSONAL AND SOCIAL

News of Men and Women of the Industry

The Fuel Efficiency Advisory Committee having been depleted by the death of Dr. G. E. Foxwell and the absence abroad of Mr. W. L. Boon, O.B.E., the Minister of Power has appointed the following as additional members of this Committee:—**Dr. D. T. A. Townend,** C.B.E., D.I.C., F.R.I.C., Hon.M.Inst.Gas E., M.I.Min.E., F.Inst.F., Director-General of the British Coal Utilisation Research Association, and **Dr. A. C. Monkhouse,** F.R.I.C., Director of the Fuel Research Station of the Department of Scientific and Industrial Research.

Mr. T. B. Henderson has joined the British Radio Corporation, Ltd., and will be engaged in sales promotional activities in connection with "His Master's Voice" radio and television. Mr. Henderson, who has been associated with the radio trade for the past twenty-five years, has for the last eight years been sales director of John Trapp, Ltd.

Thorn Electrical Industries, Ltd., announces the appointment of **Mr. R. Jessel,** Ph.D., F.Inst.P., A.M.I.E.E., as chief engineer of its Domestic Equipment Division, which includes Tricity Cookers, Ltd. Dr. Jessel was previously chief engineer with Electronic Tubes, Ltd. From 1929 until 1933 he was demonstrator in physics at the Imperial College of Science and Technology and in 1933 joined E.M.I. as physicist to the Domestic Appliance and Refrigeration Departments. In 1945 he joined Parnall (Yate), Ltd., and from 1948 to 1952 was in charge of Nash & Thompson, Ltd., scientific instrument makers.



Dr. R. Jessel

Mr. S. J. Wrigglesworth, O.B.E., has been appointed deputy managing director of Oldham & Son, Ltd. **Mr. Orlando Oldham,** son of the chairman, has been appointed as Mr. Wrigglesworth's personal assistant.

Mr. R. Ritchie, B.Sc.Tech., northern manager of Klockner Moeller England, Ltd., has been appointed to the board as technical director. Mr. Ritchie was educated at the Warrington Grammar School and served as an apprentice in the aircraft industry with Electro-Hydraulics & Conveyancer Fork Trucks, Ltd., Warrington. He gained his higher national certificate in electrical engineering during his apprenticeship and also won a scholarship to the Manchester College of Technology, where he obtained a B.Sc.Tech. degree. He later moved to Brookhirst Switchgear, Ltd., and after two years joined Klockner Moeller England, Ltd.

Mr. N. Pickles has been appointed manager of the Lincoln branch office of British Insulated Callender's Cables, Ltd. Mr. Pickles joined Callender's Cable & Construction Co., Ltd., at Anchor Works, Leigh, in 1924. He was transferred to the Nottingham sales office in 1930, serving there as an assistant until 1939. He then transferred to the Sheffield colliery contracts and sales office, where he assisted in the formation of the Carlisle branch office. After war service he joined the staff of the Leicester branch office as a representative. His appointment to the Lincoln branch office follows the retirement of Mr. A. S. Gee.

Mr. N. Pickles

The Northern Aluminium Co., Ltd., announces the following new appointments in the Sales Department:—**Mr. C. J. Buchanan-Dunlop,** formerly of Birmingham sales office, has taken up the appointment of manager of the Sales Administration Division, Banbury, and **Mr. J. A. Ambler,** formerly head of the metallurgical section of the Sales Development Division, takes charge of a newly-formed market research section of the Sales Department, also with offices in Banbury.

Mr. G. B. Campbell has been appointed secretary of the Radio Industry Council in succession to **Mr. R. P. Browne,** O.B.E., who has retired through ill-health.

Mr. Campbell became assistant secretary in 1940 of the Radio Manufacturers' Association (an organisation which was succeeded by the Radio Industry Council), and he has been acting secretary for some months.

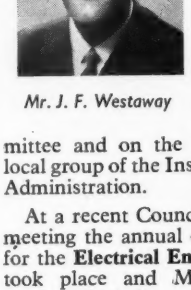
Mr. Browne became the first secretary of the R.I.C. in 1945, after having been associated since their inception with the various organisations which the Council replaced. He joined the first of these, the National Association of Radio Manufacturers, in 1924.

Mr. W. E. Cooper, a director of Bakelite, Ltd., has retired from the board owing to ill-health, and he has been presented with a television set by Mr. H. V. Potter (chairman) on behalf of the directors. Mr. Cooper has been associated with the company and its predecessors for more than thirty-five years.

Mr. A. Noel Smith, chairman of the London Electric Wire Company & Smiths, Ltd., has resigned from the chairmanship of the company, as intimated at the recent annual general meeting; he retains his seat on the board. He will be succeeded as chairman by **Mr. E. L. Wildy.**

The **British Scientific Instrument Research Association** held its annual luncheon at the Connaught Rooms, London, on 16th July. The chairman, Mr. J. E. C. Bailey, C.B.E., in welcoming the guests, paid special tribute to the work of the members of the Association's Research Advisory Committee and to the D.S.I.R. visitors. Sir Owen Wansbrough-Jones, chief scientist of the Ministry of Supply, replying on behalf of the guests, stressed the growing importance of direct-reading instruments both for laboratory and industrial use. He underlined the difficulties encountered in any research organisation where the customers' needs and the designers' ideas had to be reconciled. Emphasising that with modern techniques, technical problems were usually capable of solution, he suggested that greater importance should be placed on what had now come to be known as market research. The luncheon was followed by the annual general meeting.

Mr. J. F. Westaway, A.M.I.Prod.E., has been appointed works manager to Westool, Ltd., St. Helen's Auckland. Mr. Westaway was previously with Wild - Barfield Electric Furnaces, Ltd., as assistant works manager. Mr. Westaway, until his move north, was secretary of the Watford Productivity Committee and on the committee of the local group of the Institute of Industrial Administration.



Mr. J. F. Westaway

At a recent Council of Management meeting the annual election of officers for the **Electrical Engineers Exhibition** took place and Mr. J. Flood was re-elected chairman of the exhibition company. Mr. R. F. Mathieson was re-elected deputy chairman and Mr.

J. H. K. Pendry, hon. treasurer. New members elected to serve on the Exhibition Organising Committee were Messrs. G. Kitchener, J. H. McCarthy and L. R. Perkins. Also on this Committee are Messrs. J. Flood, R. F. Mathieson, E. J. Sutton and the new national chairman of the A.S.E.E., Mr. G. H. Parker. Mr. Mathieson was also elected chairman of the Exhibition Organising Committee in place of Mr. E. J. Sutton, who relinquished this position. Messrs. Kitchener, McCarthy and Perkins also serve as officers of the exhibition company.

The President of the Board of Trade has appointed **Mr. W. R. Black,** J.P., to be chairman of the National Research Development Corporation in succession to the late chairman, Sir Alan Saunders, who died in February. Mr. Black is managing director of Associated Commercial Vehicles, Ltd.

Mr. C. L. Hills has been appointed contracts manager of the Meter and Time Switch Sales Division of Sangamo Weston, Ltd. He was previously manager of the south eastern area.

Mr. C. L. Hills

The new principal of the Wolverhampton and Staffordshire College of Technology is to be **Mr. Robert Scott,** B.Sc., vice-principal of Bolton Technical College. Mr. Scott's appointment recently announced takes effect from 1st January next.

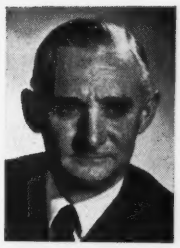
Mr. Scott was educated at Liverpool University and Cambridge, and before joining Bolton Technical College staff in 1954 he was with the Military College of Science at Bury and at Shrivenham.

He has had industrial experience with the General Electric Co., Ltd., the British Thomson-Houston Co., Ltd., and the Metropolitan-Vickers Electrical Co., Ltd.

Mr. V. D. MacLachlan, sales director and general manager of Honeywell-Brown, Ltd., has completed twenty years' service with the company and to mark the occasion he was recently entertained at a 20th anniversary dinner party, during which Mr. E. C. Vorlander (managing director) paid tribute to him. Mr. MacLachlan was presented with a "20-year pin" by Mr. O. B. Wilson, vice-president of the company's associates in Philadelphia.

Mr. G. Cluley has retired from the Metropolitan-Vickers Electrical Co., Ltd., after thirty-seven years' service. In 1924 he was appointed assistant chief engineer, Switchgear Department; this was followed in 1945 by his appointment as consulting engineer, Switchgear Department. Mr. Cluley's work has involved a considerable amount of travel overseas, including visits to Russia, Poland, Hungary, Roumania and Scandinavian countries, and in 1954 he made an extensive tour of South Africa and the Rhodesias.

Mr. G. Cluley



Mr. R. Clough

Mr. J. Harwood

Mr. R. Clough, superintendent, Switchgear Department, of the Metropolitan-Vickers Electrical Co., has been appointed assistant works manager (inventory control), in which capacity he will be concerned with inventory in all establishments controlled by the company. **Mr. J. Harwood** succeeds him as superintendent, Switchgear Department.

Mr. Clough received his technical education in Australia, and joined the company in 1926 as a college apprentice. On completion of his apprenticeship he transferred to the manufacturing staff of the Switchgear Department, of which he was appointed superintendent in 1949.

Mr. Harwood joined the company as an apprentice in 1931. Since 1937 he has held various positions on the manufacturing side of the Switchgear Department, leading to his appointment as assistant superintendent in 1953.

Mr. F. A. Croft has been appointed to the board of Walker Bros. (Electrical Enginers), Ltd. His particular interest is in the management of the Electrical Installation Contracts Department which he joined in September, 1953.

The East Midlands finals of the **Electrical Industries National Golf Championship** were held at the Longcliffe Golf Course, nr. Loughborough, on 10th July. Some 101 competitors took part and the following prizes were awarded:—Best net score, Mr. K. D. Pears; second best net score, Mr. W. C. Geary; and third best net score, Mr. L. C. W. Turner. Best scratch score, Dr. J. McDowall; and second best scratch score, Mr. C. H. Bromley. Best veteran, Mr. M. K. Booth; and second best veteran, Mr. J. T. Field. Visitors' best net score, Mr. R. Johnson; visitors' second best net score, Dr. Graham; and visitors' third best net score, Dr. McQueen. Booby prize, Mr. P. Evans.

Mr. H. Cobden Turner, J.P., M.I.C.E., M.I.Mech.E., M.I.E.E., managing director of Salford Electrical Instruments, Ltd., and of its subsidiaries, G.P.A. Tools & Gauges, Ltd., and British Ferrocart, Ltd., has retired from that position which he has held for 35 years. Mr. Turner was educated at Manchester Grammar School, Salford Technical College and the Manchester College of Technology. He was apprenticed to the General Electric Co., Ltd., at Salford, and also worked as an experimentalist with Ferranti, Ltd. From there he went to the Electrical Apparatus Co., founding that company's Meter Department, and then joined the British Westinghouse Co. (now Metropolitan-Vickers) where he worked in the sales and meter engineers' departments. He joined Salford Electrical Instruments in 1918.

Mr. Turner was chairman of the Measurements Section of the I.E.E. for 1937-38, and chairman of the North Western Centre in 1941-42. He is a member of two Livery Companies—the Haberdashers and the Worshipful Company of Makers of Playing Cards. His many patents include the proximity fuse.

The Osram Cup, presented by the **General Electric Co., Ltd.,** at the National Air Races each year, was won this year by F/Lt. H. B. Iles, who also won the National Air Racing Championship, on aggregate points, for the second year running.

Mr. A. E. Hawkins, B.Sc.(Eng.) Lond., A.M.I.E.E., personal engineering assistant to the chief engineer of the Central Electricity Authority, has been appointed system planning engineer to the Authority. Mr. Hawkins received his technical education at Norwich Technical College and became an articled pupil of the late Mr P. E. Rycroft. then chief engineer and general manager of the Great Yarmouth Corporation Electricity Department; he subsequently became technical assistant (generation) at the Corporation's South Denes power station. In 1937 he joined the Central Electricity Board as a grid system control engineer, later being promoted assistant operation engineer, South East and East England District. Early in 1945 he went to the Board's headquarters as assistant commercial manager. From 1946 until 1948 Mr. Hawkins was deputy engineer and general manager of the Islington Electricity Department. At vesting date he was appointed by the South Eastern Electricity Board as manager of the Croydon District. He joined the Authority in 1951 as chief assistant

Mr. A. E. Hawkins

engineer, System Operation Branch, at headquarters, and was appointed personal engineering assistant to Mr. V. A. Pask, the Authority's chief engineer. Mr. Hawkins is an active member of the Electrical Power Engineers' Association and is at present chairman of the staff side and vice-chairman of the National Joint Committee dealing with the salaries and conditions of service of managerial and higher executive officers in the electricity supply industry.

Mr. P. W. Cash, B.Sc.Eng., A.C.G.I., M.I.E.E., system design and development engineer of the Central Electricity Authority, has been appointed system operation engineer at headquarters.

Mr. W. H. Richards has been appointed production superintendent of Marconi Instruments, Ltd. Up to the time of this latest appointment, Mr. Richards was assembly department superintendent, and he will now be responsible to Mr. S. G. Spooner, production manager, for the administration of all main manufacturing departments. He joined the Marconi organisation in 1931.

[Mr. W. H. Richards

Mr. A. Wright has been appointed a director of Rashleigh Phipps & Co., Ltd. He will continue to carry out his duties as secretary.

Mr. P. A. Mills has retired from the A.E.I. Lamp & Lighting Co., Ltd., and on 28th June he was presented with an ornamental mirror and a cheque by Mr. C. W. M. Phillips, manager of the Lighting Department, on behalf of his colleagues. Mr. Mills joined the design office of the Edison Swan Electric Co. in 1921, transferred to Harcourts, Ltd., in 1934 and then returned to Ediswan in 1949 when that company took over Harcourts. In 1955 he transferred with the Ediswan lighting section to the B.T.H. Co., before the formation of the A.E.I. Lamp & Lighting Co. in April last year.

Mr. A. J. Dillingham has resigned from the board of F. Perkins, Ltd., on reaching the age of seventy-five, but the company has decided to retain his services in an advisory capacity as a consultant.

Mr. J. G. S. Nisbet, general manager of Brimley & Co., Ltd., electrical wholesalers, of Birkenhead and Liverpool, has been appointed to the board of the company.

At a gathering at the offices of Hill Upton & Co., Ltd., a cheque was presented to **Mr. A. Curtis,** who recently celebrated his seventieth birthday, by the chairman, Mr. F. M. Butterfield. Mr. Curtis joined the company in 1903 and is still active as a journeyman electrician.

Mr. A. C. Gascoine has been appointed vice-chairman of the Watford Electric & Manufacturing Co., Ltd., and resigns his position as managing director after forty-nine years' service with the company. **Mr. E. Nobbs** and **Mr. R. G. Smith** have been appointed joint managing directors.

The **A.S.E.E. Golfing Society's** June meeting was held at West Herts Golf Club, Watford. The winner of the "Saints" (St. Helens) Trophy was Mr. R. E. W. King. A collection for the E.I.B.A. realised £3 2s 6d. The August meeting will be at the Kingwood Golf Club, Surrey, on 22nd August.

OBITUARY

Mr. R. V. D. Kirby, manager of the Eastern Division of the Metropolitan-Vickers Electrical Export Co., Ltd., died on 27th June at the age of sixty-one. After serving his apprenticeship with the company (1919-20), Mr. Kirby joined the White Star Line for marine experience, returning subsequently to the Metropolitan-Vickers Co. As a turbine specialist, he served in many parts of the Far East.

Further Bradwell Contracts Placed

Sir Claude Gibb Outlines Nuclear Energy Background

AT a Press conference in London last week, sponsored by the Nuclear Power Co., Ltd., at which the names of some 255 sub-contractors for the Bradwell nuclear power station were announced, Sir Claude Gibb, chairman of the company, first addressed the gathering on the background of nuclear energy development.

He said that the construction of nuclear power stations called for a great deal of concentration and combined effort on the part of many hundreds of firms. At the present moment work was proceeding at the Bradwell nuclear power station in Essex, with over 250 firms all taking part. The Nuclear Power Plant Co., Ltd., was a consortium of eight companies all of them previously concerned with orthodox power station construction. The eight companies had between them placed subcontracts, but as they proceeded further with the construction the number of firms employed might well go up to one thousand.

The Bradwell design was "frozen" in November, 1955, to enable them to submit a tender to the Central Electricity Authority by 1st October, 1956, and it was natural that from November, 1955, to July, 1957, a great deal of knowledge had been gained with the result that to-day they could commence building a new power station that would have roughly 30 per cent greater output than the Bradwell station would have, and which would cost probably no more than 15 per cent more than Bradwell. The No. 1 "set" at Bradwell would not be running fully until 1960, but in the meantime they would be gaining experience, as would be the hundreds of co-operating companies.

The remainder of the conference took the form of question and answer, but in the main it embraced clarification and expansion of what Sir Claude had said in his opening address. An allied subject which was introduced, however, was load factor. Sir Claude said this country's annual average load factor was about 46 per cent, that of Ontario (Canada) about 74 per cent and in the United States the figure was about 68 per cent. As a nation we had got to build our night and week-end loads. Electrification of railways helped quite a lot in that way.

He believed the future of nuclear power stations would be likely to become associated with pumped storage. Surplus electricity from nuclear stations would be used at night by pumping water up into reservoirs in the mountains and during the day peak the water would flow back through hydro-electric turbines. The economics of electricity would work out best on such a development of pumped storage in association with nuclear power.

PRICES OF MATERIALS

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

ALUMINIUM ingots	ton £197 0s 0d
COPPER, H.C. Electro	ton £219 15s 0d
Fire Refined 99·70%	ton £218 0s 0d
Fire Refined 99·50%	ton £217 0s 0d
COPPER Tubes ..	lb 2s 1d
Sheet	ton —
H.C. wire and strip ..	ton £265 15s 0d
LEAD, English ..	ton £90 5s 0d
Foreign	ton £89 0s 0d
MERCURY	flask £87 0s 0d
TIN, block (English) ..	ton £748 10s 0d
ZINC, G.O.B. Foreign	ton £74 15s 0d
Electrolytic	ton —
BRASS Tubes (solid drawn)	lb 1s 8¾d
Sheet	ton —
Wire	lb 2s 5¾d
PHOSPHOR BRONZE Wire	lb 3s 9¾d
PLATINUM	oz £34 0s 0d
RUBBER, No. 1 R.S.S. spot	lb 27¼d—27½d

The Electricity Act, 1957

New Organisation for England and Wales Puts an End to Central Control

By D. J. BOLTON, M.Sc., M.I.E.E.

LAST week the Royal Assent was given to the Bill to reorganise electricity supply in England and Wales. The new authorities will take over on 1st January, 1958, just ten years (all but three months) from the vesting date under the Nationalisation Act of 1947. This represents the second piece of major regrouping carried out within the nationalised structure, the first being the splitting-off of the South of Scotland area two years ago.

Even those who have followed the parliamentary reports in this and other journals and have plotted the lengthy and occasionally tempestuous passage of the Bill through its various stages in the House may still be in some doubt as to what exactly has and has not been included. Now that the process is completed and the finished article is on the Statute book, it is interesting to trace how much of it originated in the Herbert Committee recommendations, how much is due to the Government variations thereon, and how much to the cut-and-thrust committee work of ordinary members of Parliament. It will be generally conceded that the Bill has been notably improved and made more acceptable as a result of the hard work put in by members on both sides of the House.

Generation and Supervision

The major change effected by the new Act, and one which is central to both the Herbert Committee's recommendations and the Government's purpose in promoting the measure, is the separation of the functions of generation and overall supervision which are at present both exercised by the Central Authority. A new body, the Central Electricity Generating Board, will have responsibility only for generation and main transmission in England and Wales, with a special responsibility for the expanded nuclear power programme. The supervisory and controlling powers now exercised by the Central Authority over the whole field of electricity supply (including distribution) will devolve in part on a newly-created body, the Electricity Council; in part on the Area Boards; and in part disappear from the industry entirely and in effect will accrue to the Minister of Power.

The net result will be that the Area Boards will have somewhat more power and greater autonomy but the industry as a whole will no longer have a "head" capable of speaking and acting for it with authority, and of exercising any general control over its policy and operations.

The Generating Board will consist of a chairman and seven to nine members appointed by the Minister, and it will take over the generating functions of the present Central Authority together with all its property, rights and liabilities except those (not pertaining to generation) which vest in the Electricity Council. No sub-divisions of the Generating Board are specified, and it must be presumed that the existing Divisional structure will be maintained for the time being.

The second body set up by the new Act is the Electricity Council. Its functions are to be advisory and permissive rather than compulsive, and it is intended to act as a forum whereon leaders from the two sides of the industry—generation and distribution—can discuss their common problems and concert their joint and separate activities. It will not be an executive authority and its character will be more that of a cabinet or the board of directors of a large holding company. The Council's main duties are to advise the Minister on questions affecting the industry, and to promote and assist the Electricity Boards in maintaining and developing an efficient, co-ordinated and economical system of supply.

Although the Council is not directly responsible for co-ordinating the industry's activities as a whole, it has a special responsibility for scrutinising and advising on the Boards' capital investment programmes. The Council also has power, when so authorised by the Boards, to carry out common services on behalf of the industry. These are likely to include research, the raising of capital, the maintenance of joint machinery regarding employment, and related staff problems such as safety, welfare and training.

With these functions in view it is not surprising that the composition of the Council is largely made up from the personnel of the Boards themselves. In the Bill as first introduced it consisted very simply of the chairmen of the twelve Area Boards, two members from the Generating Boards and one to three outside members appointed by the Minister, one of whom would be the Council's chairman. This composition was vigorously debated during the Committee stage of the Bill, and the Act provides for up to six members (including the chairman and two deputy chairmen) to be appointed by the Minister from persons who are not members of an Electricity Board. These will be additional to the fifteen ex officio members (three members from the Generating Board and the twelve chairmen of the Area Boards) making twenty-one in all which might be considered somewhat on the big side.

Broadly speaking, it would appear that electricity organisation in England and Wales has now come much nearer to the gas pattern, with a central Council assisting but not controlling a number of independent regional corporations. The two situations are, however, so different that there is no reason why the same solution is best for both. The Gas Council has a relatively easy task because it has no nation-wide production machine to deal with, whereas the electricity industry can never lose sight of the fact that public generation in this island is technically one system and can never again be chopped up into separate pieces. In fact, whilst political and legislative changes in recent years seem to have shown a centrifugal tendency, technical developments such as atomic generation, pumped storage and higher-voltage transmission, all tend to increase the economy of operating as a single unit from the south of England to the north of Scotland.

Autonomy and Economics

The Herbert Committee laid great stress on the importance of the commercial criterion both as a measure of efficiency and as a spur to greater efforts. Each element in the industry should, it was felt, approximate as nearly as possible to a self-contained trading organisa-

tion and should endeavour to "make a profit" or its nearest equivalent within the context of nationalised operation. This principle was accepted by the Government, and the Act probably goes as far as is feasible in carrying it out. Instead of the industry as a whole having to balance its accounts each separate Board (that is to say the one Generating Board and the twelve Area Boards) is now charged with the duty of seeing that its revenues are not less than sufficient to meet its outgoings taking one year with another.

The implication of this is that whilst there has to be prior consultation with the Electricity Council before tariffs are fixed, the individual Boards will be more closely (because financially) responsible for fixing the prices of what they supply. This is equally true of the Generating Board which must fix the price of its bulk supplies so as to show a profit (or avoid a loss) on its operations. And herein lies the rub.

One difficulty in legislating for the electricity industry is that the technical and the commercial divisions do not coincide. Technically there is a clearly marked division into the two functions of generation and distribution, and the administrative machinery follows the same cleavage both in past legislation and still more in the latest Act. But when it comes to making each side of the industry into a commercial concern one meets the insuperable difficulty that all the money made by the industry is on the distribution side. It is only the Area Boards which receive money from the public for services sold competitively in the open market, whereas the Generating Board (which actually consumes about 70 per cent of the money) merely sells its products within the industry itself and not to the public. Until there is some objective way of evaluating this product and finding its market price there is no possibility of running either side of the industry by itself as a commercial concern.

Inter-Board economics are a little like the large see-saw which can sometimes be seen in a children's playground, with several small boys at each end and a somewhat older person standing in the middle with one foot on each side. In this case there is one big boy—the Generating Board—at one end of the plank, and twelve smaller boys—the Area Boards—at the other, whilst the person in the centre is the Electricity Council. The plank itself represents the bulk supply tariff and the aim of each of the bodies on the ends is to maintain a balance. There may be scope for a certain amount of mutual shuffling between the Area Boards at their end through changes in the proportions of the tariff but the main factor will be changes in the total magnitude. This will bring one end down just as surely as it brings the other end up, and the question is whether the person in the middle will have sufficient horse-power to make the whole machine work at its best.

The fixing of the bulk supply tariff is therefore the crux of the matter when it comes to operating the Boards as separate commercial concerns. It would be perfectly easy for the Generating Board to show a handsome profit merely by slightly increasing this tariff, and the Area Boards could all show profits if the tariff were reduced. It could, of course, be fixed so that each side of the industry made the same percentage margin of profit or loss, but this would make nonsense of the clear intention of the Act, which is to make all the Boards individually responsible for paying their way.

Financial Provisions

The Act does not go so far in the direction of financial independence as the Herbert Committee recommended. Instead of the Boards being allowed to float loans in the open market the Electricity Council is empowered to issue British Electricity Stock which the Treasury may guarantee up to a maximum indebtedness under all heads of £1,400 million. The Council then allocates the stock as between the Generating Board, the Area Boards and the Council itself, and the ultimate responsibility for meeting the obligations in respect of this stock will rest with these bodies according to this allocation.

Each Board is required to establish a reserve fund for its own purposes, one of which is stated as being the prevention of frequent fluctuations in the Board's charges. In addition each Board has to contribute to a central guarantee fund established by the Electricity Council such sums as the Council shall determine. The purpose of this central fund is to make good any temporary inability on the part of any Board or the Council to fulfil its loan obligations, and also to repay to the Treasury any cost incurred in fulfilling the latter's guarantee.

Each Board and the Council is required to make its annual report direct to the Minister and no provision appears to have been made for a consolidated report. Among minor changes, the Area Boards are to have limited powers to generate electricity for themselves in special circumstances. Such powers would enable them to undertake combined power and heating schemes.

Power to Manufacture Equipment

One of the most hotly contested items in the debates on the Bill concerned the Generating Board's power to manufacture. Before nationalisation it was usual for an electricity company to be free to manufacture its own plant if need be. This freedom had obvious advantages on a small scale in respect of such things as spare parts or specialised equipment which might not be so quickly or cheaply obtainable from the regular manufacturers. On a larger scale it could serve as a threat to counter price rings. In the 1947 Act the Central Authority had power to manufacture electrical plant and fittings whilst the Area Boards' powers in this respect were limited to the repair and maintenance of fittings. Under the latest Act the Generating Board will not be allowed to manufacture plant unless it is satisfied that available facilities for obtaining such plant at reasonable prices are, or might become, inadequate.

Consultative Councils

Two small changes have been made affecting the personnel and the functions of these Councils. In the past, not less than half of the members had to be appointed from a panel nominated from members of local authorities in the area. In some areas this proportion made it difficult to ensure adequate representation of non-domestic consumers, and under the new Act the minimum proportion is to be two-fifths. In addition, the Councils are in future free to consider any matter affecting the variation of the bulk supply tariff for that area. This last sounds fair enough (since retail tariffs are closely related to bulk supply tariffs and can hardly be considered effectively without them) but how is it going to work out? Tariffs can be a complicated business and can hardly be understood by a lay committee without some technical assistance. In discussing the retail tariffs in an area such assistance was forthcoming, and the Board making the tariff proposals could always supply officers to explain and justify their proposals. But the bulk supply tariff is a national formula and it is not so easy to establish a liaison between those in London who constructed it and those in an Area Consultative Council who may perhaps wish to object to it.

The Act places a new obligation upon the Boards, the

Electricity Council and the Minister to take into account the effect which new projects may have on the preservation of amenities. There are new provisions governing the procedure to be followed before power station and overhead line projects receive statutory consent, whose object is to ensure that individual and special interests shall receive proper attention.

Finally, who will be the members of the new Generating Board and the outside members of the Electricity Council? The range of choice will at least have been made a little wider by the Government announcement (in line with the Herbert Committee recommendation) that the salary ceilings were to be raised. Much of the Act's success will depend upon a wise choice, and it will be an exciting moment in the industry when rumour is at last overtaken by certainty.

INDUSTRY AND THE HOUSE

Inflation, the Finance Bill and the Electricity Act

By A. M. F. PALMER, A.M.I.E.E., M.Inst.F., M.P.

FOR the present generation, inflation in the sense that money buys less and less has been going on since 1940. To those whose memories embrace a longer span and can call back pre-1914 prices it has been progressing since the turn of the century. Could a merchant from the first Elizabeth's reign return to the London of the second Elizabeth I am sure also he would be staggered to find that the pence, with which he transacted so many of his dealings, are reckoned now of little account even by the children. Yet the corridors of the Commons have buzzed in the last week or so with the news of a startling discovery. It is that everything gets dearer and dearer all the time. As I have often remarked before in these columns, Westminster is a curious place, even to the inmates.

True, in the crusading days of '50 and '51—as remote now as the Jacobite rebellion—there was a notorious scandal called rising cost of living for which, as faithful Conservatives know, the party now relegated to the Opposition benches was entirely responsible. But this new creeping phenomenon, perhaps observed from the freshly gilded pinnacles above Big Ben by some particularly vigilant Government supporters, is obviously different. At any rate, it would be wise to give it a new name. Hence it has been dubbed " on cost inflation " and is hunted on Mondays by Mr. Nabarro and his pack who believe it has gone to earth in the nationalised industries —probably under Hobart House.

Monday is, of course, power day when not only coal but the flanks of three or four nationalised industries are exposed for routine savaging with only Mr. Maudling to stand between. This he does very skilfully with an obvious determination to survive at all costs. His standard method is a delight to watch. It usually goes something like this: his honourable friend is inaccurate in the facts given, has gone sadly astray in the conclusion drawn and has generally confused the issue but the whole House should be grateful to his honourable friend for putting the question down. Last Monday, when the Ministry of Power was top of the bill, the Paymaster General successfully used this disarming approach to counter a good score of Conservative back bench questions on the coal price increase. All the questioners were angry, most of them young, and more than a few, I could not help noticing, sit for marginal seats.

The Labour pack with Mr. Harold Wilson in the van—and it is necessary these days for an Opposition leader to get up really early to make sure of that position—hunts on a different day, when the Chancellor, Mr. Thorneycroft, is about, for greater fun. Being an old-fashioned party as some would say, it prefers the older name for its quarry; just as did the Conservatives six or seven years ago, it calls the object of its complaint " rising cost of living " and faithful to the tradition of '51 blames the Government!

However, the big occasion for the grand Opposition attack will be next week when a supply day will be devoted to a vote of censure on the Government for its alleged maladroit handling of the country's financial affairs. Mr. Wilson grimly remarked on Friday, when speaking on the third reading of the Finance Bill, that although the rules of order prevented him from enlarging on the theme there and then, Labour's arguments used earlier about the Budget changes appeared " immeasurably stronger " in the light of recent events.

Overseas Trade Corporations

The Finance Bill with all its complicated clauses had dragged on for so long that everyone had become heartily sick of it. On this final Friday Mr. Enoch Powell, the Financial Secretary to the Treasury, claimed that its outstanding feature this year was the change in the tax system for overseas trade corporations. Some companies which had non-resident subsidiaries, particularly those in Commonwealth countries, might contemplate repatriating the subsidiaries; Mr. Powell urged them to seek a solution within the terms of the Bill. It might be possible to have a central board of directors in the United Kingdom and a local board managing operations in the overseas territory. With such an arrangement a company could both qualify as an overseas trade corporation and at the same time retain, through its local board, that direct association with the Commonwealth which the Government wished to support.

In addition to his warning about political storms to come, Mr. Wilson contended that the main gain in employment from the provisions of the Bill would be in an already fully employed profession—the parasitical class of " tax avoidance experts " with which he said the City of London was infested. Hundreds of new methods of tax avoidance were being worked out and he hoped the Government would give warning of possible retrospective action which was the best antidote to tax dodging by companies and others. Also on taxation, Sir Patrick Spens, who represents South Kensington in the Conservative interest, said he looked forward to the time when they

would get rid of what he called the " absolutely hopeless, unreal and undesirable division " between those whose taxable income was less than £2,000 a year and those who paid tax on over £2,000. It was creating an unreal division in society and the sooner it was abolished the better.

The Chancellor of the Exchequer, replying to the debate, said that in present circumstances, with the need to strengthen the balance of payments, the most they could do was to allow for tax relief amounting to about £100 million. In a loud, firm voice as if to make quite certain that everyone would really believe him, Mr. Thorneycroft proclaimed that Government policy in this respect was " rightly attuned to the needs of the moment." This sentiment is one which no doubt would have satisfied the celebrated Pangloss, but as to whether it will in the end satisfy the electors on all counts only time will tell.

Complete with the Royal Assent the Electricity Act, as we must now call it, first saw the light of parliamentary day a month before Christmas of last year and has taken nearly eight months to complete its journey through both Houses. When the controversial Lords amendments came to the Commons the week before last, they had a quieter reception than at one time was thought likely. Perhaps an understanding had been reached, for those Government members who had from time to time harried the Minister with their demands during the earlier stages and had often described the Bill as " socialistic " in character were conspicuously absent. Attendance on the Labour side was hardly better and in a chamber full of light and green space, on a warm summer day, the Bill romped home.

It would seem that the Government have now conceded the point—strongly pressed by the Opposition—that because the Electricity Council has control of national negotiations on wages, salaries and conditions as well as being responsible for joint consultative machinery, there should be someone with trade union experience on the Council. The amendment—which was accepted—provides that in appointing the independent members the Minister of Power should have regard to people who have had experience in " the generation or supply of electricity, industrial, commercial or financial matters, applied science, administration or the organisation of workers." It is thus clear that the Minister can now put in a trade unionist if he wishes to do so and I think it certain that one, in fact, will be chosen.

Public Inquiry Compromise

However, the main debate of the afternoon was on a proposed Government alteration of the Lords' new clause which makes special provision for public inquiries. When the Government in the " other place " some time ago came forward with a concession, which went a long way to meeting the objections of land owners to alleged arbitrary action by Electricity Boards, their Lordships took not only this, but much more besides. They so altered the Bill that it had become obligatory for the Minister to order a full scale public inquiry if only two people or interests objected to an electricity extension. Remembering how in the course of a year many thousands of electricity schemes go forward for approval, it is easy to appreciate that development would have come to a standstill if the Lords' suggestion had been accepted as it stood. Hence, Mr. Maudling on behalf of the Minister of Power moved an amendment to provide that where an application had been made to the Minister and the *local planning authority* objected, the Minister must hold a public inquiry. The amendment provided as well that the Minister must *listen* to objections from other quarters, but need not necessarily order an inquiry. Sir Frank Soskice for the Opposition thought the amendment a reasonable compromise which would allay a number of anxieties. In this spirit the House murmured its assent.

I hear that the principal appointments under the Act are likely to be made fairly soon and publicly announced quickly so as to reduce the sense of uncertainty about the future.

Electricity Bill Receives Royal Assent

THE Commons were summoned to the House of Lords on 17th July to hear a Royal Commission consisting of the Lord Chancellor, Lord Hailey and Lord Mathers, representing the Queen, signify the Royal Assent to the Electricity Bill.

Lord Mills, the Minister of Power, had earlier introduced the Commons amendments (summarised in last week's issue of the *Electrical Review*) and these were approved by the Lords.

Concerning the Commons amendment relating to the procedure for public inquiries, Lord Mills said that the projects most likely to be controversial were those for power stations and overhead lines placed on pylons. For these it was proposed by a new sub-section to place on the Minister a duty to prescribe by regulations how Electricity Boards' applications for consent were to be advertised, and how objections were to be lodged. It was best that these matters should be left to be dealt with in regulations because they would have to be worked out in detail.

The regulations must require time limits to be fixed for the lodging of objections and would permit the Minister to direct that individual notices should be served, where appropriate, on such bodies as the Council for the Preservation of Rural England, the corresponding bodies for Scotland and Wales, or a neighbouring authority which might be interested although the project concerned might be outside its area. Regulations would ensure that copies of any objections sent to local planning authorities were also sent to the Minister. On considering the objections, the Minister could order a public inquiry even though the local planning authority had not objected.

" I can assure your Lordships that when exercising that discretion, I shall have individual interests very much in mind," said Lord Mills. " The House will probably recall a recent case in which consent to a high voltage line has been refused because of representations from objectors other than the planning authority. But not every case calls for a public inquiry—indeed, it is probable that most objectors would prefer not to have one if their grievances can be met without it. Whenever the objections are of such a nature that a public inquiry is obviously the best way of dealing with them, or if apart from the objections there are other considerations of policy arising from the nature of the project which seem to call for a public inquiry, then I can assure your Lordships that I shall order one. After the most careful thought I am satisfied that our proposals will ensure proper attention to individual rights and interests. . . . To go farther than we have done would be to put excessive strain upon the administrative machine which might well result in a breakdown and would certainly lead to delays that I could not countenance."

The Commons amendments were agreed to, and Lord Mills thanked other peers for their helpful and understanding attitude during the passage of the Bill.

Other Bills which received the Royal Assent included the Thermal Insulation (Industrial Buildings) Act.

PARLIAMENTARY REPORT

Supergrid and Nuclear Power

In the House of Lords last week Lord Braye asked if it would not be wise to halt the costly supergrid project until such time as investigation could reveal whether its use would justify the expense, in view of the now rapid development of small nuclear power stations which might render such projects as the Donington-Iver supergrid and others planned over ten years ago obsolete before construction.

Lord Mills said the Government were advised that the generation of electricity in this country in small nuclear power stations was unlikely to prove economic within the near future. Indeed, technological progress was making it economic to produce increasingly large quantities of electricity in each generating unit. It would, therefore, remain necessary to transport large blocks of power over considerable distances by means of a supergrid system.

However, the advent of nuclear power had made it possible to site power stations in consuming areas away from the coalfields and had therefore made necessary alterations in the layout of the supergrid. He understood from the Central Electricity Authority that these changes would not affect the need for a line from Donington to Iver.

Lord Lucas of Chilworth said that the present public concern over Government expenditure on projects which were abandoned after considerable money had been spent was worthy of the Minister's serious consideration. Was he aware that the 275 kV grid that was started to be built from Fleet in Hampshire to Drakelow in Derbyshire had been abandoned at considerable cost?

Lord Mills said it was quite evident that changes in the generation of power had necessitated a re-examination of the supergrid lines. It was much more economic to face facts and to do away with a line rather than carry on one which should not now be erected or completed. This matter had his constant care and attention.

Lord Lucas asked if the siting of the projected atomic power stations had any regard to the erection of the 275 kV supergrid, or if there would have to be a supergrid to fit the siting of those stations.

Lord Mills said it would be necessary to provide connections from the atomic power stations to the supergrid at convenient points. The general location of the supergrid as originally determined had been varied because of the changes which had occurred.

Lord Lawson asked whether there had been any serious examination of the possibility of placing the supergrid lines underground.

Lord Mills replied that the cost was about £300,000 a mile compared with about £20,000 for an overhead line. Further, considerable losses of electricity occurred by reason of "undergrounding" and there had to be boosting by means of stations. That added to the cost and made it quite prohibitive to substitute underground for overhead lines, except in very exceptional circumstances.

Post Office Mechanisation

After he had made his announcement of the proposed increases in postal and telephone charges, the Postmaster General, Mr. Marples, was asked by Capt. Orr what savings in staff had been made at the Post Office.

Mr. Marples replied that they had the most advanced electronic sorting machine in the world in operation and had ordered an electronic wages computer which was the biggest in the country—possibly in the world. "But there is no electronic machine yet invented that will walk up the drive and deliver the letters," he added.

Air Pollution by Power Stations

Mr. Philip Noel-Baker asked the Minister of Housing and Local Government what powers, under his regulations, the Senior Alkali Inspector had to prevent air pollution by power stations.

Mr. Brooke said that the question of whether further classes of works, including power stations, should be brought within the scope of the Alkali Act had been the subject of a recent public inquiry, and he would reach a decision in due course. When the Minister of Power gave his consent he normally required the use of the most efficient methods reasonably practicable for the elimination of smoke and grit.

Nuclear Powered Ships

Lt.-Comdr. Maydon asked the Parliamentary Secretary to the Admiralty whether the Civil Lords' Committee on the application of nuclear power to ship propulsion had decided which yard was to build the first ship.

Mr. Galbraith, Civil Lord, said that his Committee, which included representatives of industry, the Atomic Energy Authority and Departments concerned, had now under immediate consideration a number of schemes but was not yet in a position to make a recommendation.

Trade with China

Replying to several questions about British firms wishing to accept orders from China for goods on the quantitative control list, Sir David Eccles said that quotas for China would be additional to those already applicable to trade with the countries of Eastern Europe. Recommendations as to these quotas were due to be made in the near future by the Paris Consultative Group. British exporters' interests were looked after by our representatives on the group. The recommendations of the group and the amounts of the quotas would be confidential. Exporters wishing to accept orders for goods on the quantitative control list should submit applications to the Export Licensing Branch.

Future of the B.I.F.

Mr. Sydney Irving asked the President of the Board of Trade whether, in view of the advice given to him by the Birmingham Chamber of Commerce, he would make a statement on the future of the British Industries Fair and on the possibility of organising an International Trade Fair in Great Britain.

Sir D. Eccles said he had told the deputation from the Birmingham Chamber of Commerce that the future of this fair depended largely on the attitude of British industry towards an international fair in this country. The president of the Federation of British Industries agreed to sound his members on such a proposal. The Government were now waiting for this advice.

Hastings Tramways Bill

Mr. Nabarro withdrew his motion on the Hastings Tramways Bill (referred to in last week's Parliamentary Report) and the Bill, which relates to the replacement of trolleybuses by diesel buses in Hastings, is now being dealt with as an unopposed Private Bill.

Iron and Steel Prices

Mr. Stokes asked the Parliamentary Secretary, Ministry of Power, what representations he had made to the Iron and Steel Board to keep prices fixed at their present level in the interests of export trade.

Mr. David Renton said that no representations had been made. The Iron and Steel Board was fully aware of the need to maintain British industry's ability to compete in overseas markets.

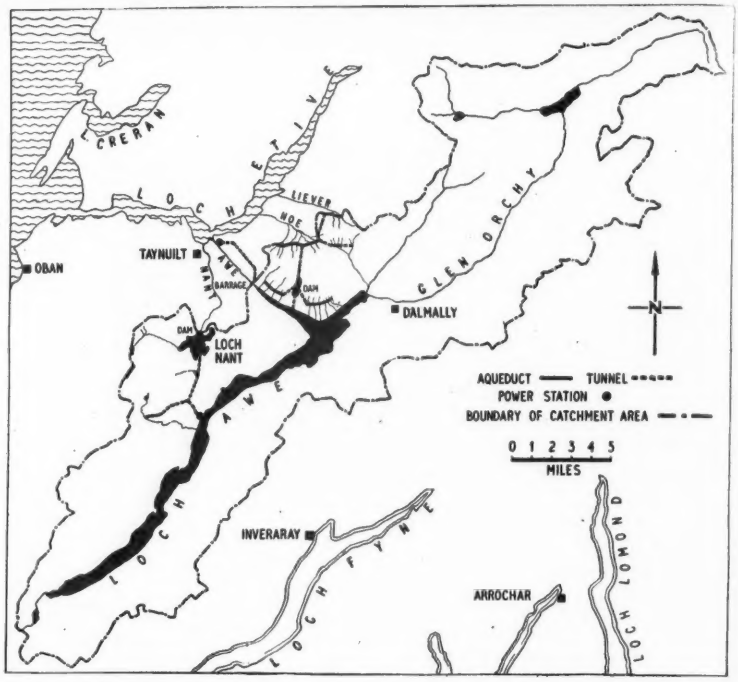
Gas and Electricity Advertising

Mr. Dance asked the Paymaster General, in view of the fact that the electricity authorities and the Gas Boards suffered no outside competition, if he would give general directions to them to reduce their expenditure on advertising the respective merits of electricity and gas.

Mr. R. Maudling: No. The electricity and gas authorities are well aware that we expect them to exercise reasonable restraint in their advertising expenditure, but it is for them to decide what forms of advertising are economically justified.

Scottish Pumped Storage Scheme

LOCH AWE PROJECT



THE North of Scotland Hydro-Electric Board's Awe Project (Constructional Scheme No. 28) published last week includes provision for the construction of the first large-scale pumped storage hydro-electric development in Scotland. The scheme proposes to utilise the flow from 324 square miles of the River Awe catchment area. The total installed capacity will be about 450 MW and the estimated cost £24,500,000.

The development will be in three sections—Inverawe, Cruachan and Nant. The Inverawe section, which is a development of the water power of the River Awe, involves the regulation of the level of Loch Awe by a low barrage a short distance downstream from the outlet of the loch. It is not intended to raise the level of the loch and so roads, piers and agricultural ground round the loch will not be affected by flooding. From the barrage, water would be taken by a tunnel to a power station situated just within the mouth of the river. The station would have an installed capacity of about 35 MW and an average annual output of 101 million kWh. Provision is made in the scheme for the release of compensation water into the River Awe from the barrage and for the construction of a fish pass there.

The Cruachan section includes the pumped storage plant and therefore will have the large capacity of about 400 MW. The date when it proceeds will be dependent on the requirements of the country's generating programme. The station will be used to absorb, at night and at week-ends when the system load is low, the surplus energy from atomic or high efficiency steam stations by pumping water from Loch Awe up to a high level reservoir. This upper reservoir will be formed in the corrie on Ben Cruachan at the head of the Cruachan Burn at a height of about 1,300ft. The reservoir will be connected by shafts to the plant in an underground power station and the water used will be conveyed to and from Loch Awe by a horizontal tunnel. The combined pumping and generating machines will be fed mainly by water pumped from Loch Awe, but this water will be supplemented by water collected by aqueducts from the headwaters of the Rivers Liever and Noe.

The Nant section of the scheme will involve the raising of the level of Loch Nant by the construction of a dam near its outlet. Water will be conveyed by tunnel and pipeline from the reservoir to the power station near Inverinan, on the shore of Loch Awe. The station will have a capacity of 18 MW and an annual estimated output of 27 million kWh. Provision is made in the scheme for the release to the River Nant of compensation water during dry periods.

Tariff Dispute

LORD WALKER, in the Court of Session, Edinburgh, on 17th July cancelled an interim inderdict granted by him five days earlier to restrain the South of Scotland Electricity Board from charging British Oxygen Gases, Ltd., Glasgow, for electricity under a tariff which the company alleges discriminates unfairly against it as a consumer of high-voltage supply. The interdict order was a sequel to an action by the British Oxygen Co., Ltd. (predecessor of the present company) against the Board alleging that the tariffs under which the Board charged for high-voltage supply were invalid, and suing for £10,000 for alleged overcharge.

Moving for recall of the interim interdict, Mr. J. O. M. Hunter, Q.C., for the Board, said that the present position was that the Board was interdicted from charging for power supplied under the existing tariff. It was continuing to supply electricity and it might be that it would be unable to recover one penny for it.

Mr. Douglas Reith, Q.C., for British Oxygen Gases, Ltd., said that the interdict proceedings were taken because Lord Hill Watson held that if the plaintiffs in the parallel action last May had taken that course they might have succeeded.

Lord Walker, in his judgment, said he was satisfied on the argument he had heard that the interim order should be recalled. The balancing factor which influenced him was that the tariff complained of was fixed in November, 1955, under statutory provisions, and that it was submitted to the company. If the company had at that time objected to the tariff as being unduly discriminatory against it, then, even if the Board had been interdicted from putting the tariff into operation, it would have been able to charge, under another provision of the statutes, in accordance with tariffs in force before the vesting date. "I think that any difficulty which the company has got itself into now is due very largely to its own dilatoriness in not objecting at the proper time," Lord Walker added. He said he would, however, grant leave to appeal to the Inner House "as the matter may be of importance."

INDUSTRIAL NEWS

Claim for 40-hour Week

Last week the Confederation of Shipbuilding and Engineering Unions presented a claim for a 40-hour working week without loss of pay and also for a standard rate of £2 a day for annual and statutory holidays. Mr. W. J. Carron, president of the Amalgamated Engineering Union, said that when the present 44-hour week was negotiated in 1947 it was regarded as a half-way house towards a 40-hour week. He contended that there were no grounds for assuming that a cut of 48 minutes a day would reduce output, since production was always much lower in the last hour of each day.

Mr. F. C. Braby, president of the Engineering and Allied Employers' National Federation, told the unions that he was profoundly disappointed that the claim should have been put forward in view of the condition of the wage settlement in May that there should be no new wage claim for at least a year. That condition was intended to give the industry a period of stability in which employers would be assisted in their endeavours to maintain and expand markets. He estimated that the immediate effect of the claim would be to put up wage costs by at least a tenth, amounting to about £65 million a year.

New Nuclear Power Company

Hawker Siddeley Group, Ltd., and John Brown & Co., Ltd., are to form a new company, to be known as Hawker Siddeley John Brown Nuclear Construction, Ltd. (with a capital of £500,000), in which Hawker Siddeley and John Brown will be equal partners. Commenting on this development, Sir Roy Dobson, director of the Hawker Siddeley Group and chairman of Hawker Siddeley Nuclear Power Co., Ltd., said that this extension of the Hawker Siddeley Group's interests in nuclear power was an augmentation of the group's diversification plans in the United Kingdom and Canada. These included the acquisition of the Brush Group, the purchase of an interest in the Algoma Steel Co. in Canada, the formation (in conjunction with the English Steel Corporation, Ltd.) of Canadian Steel Wheel, Ltd., and the acquisition of Canadian Applied Research, Ltd. The first task of Hawker Siddeley John Brown Nuclear Construction, Ltd., would probably be connected with the problems of marine propulsion.

Mr. Eric Mensforth, a director of John Brown & Co., Ltd., in a statement said that this was a natural development of John Brown's long experience of the design, manufacture, and installation of many types of large marine propulsion units, and of the company's successful entry during the last six years into the design and construction of boiler plants for large conventional power stations.

The directors of the new company are:—Sir Roy Dobson (chairman), Sir Arnold Hall, Sir William Farren, Mr. E. P. Hawthorn, Sir Stanley Rawson, Mr. Eric Mensforth, Mr. R. J. Barclay and Mr. V. A. Pask.

New Zealand Hydro-Electric Contract

The British Thomson-Houston Co., Ltd., has been awarded a contract valued at £800,000 for four further vertical hydro-electric generators for Roxburgh power station, New Zealand. The 40,000 kW, 11 kV, 136 r.p.m. machines will be similar to the four already supplied by the company which were commissioned during the latter half of 1956. The turbines for driving the new generators will be supplied by the Dominion Engineering Co., of Canada, who also manufactured those for the first four machines. With a capacity of 320,000 kW, Roxburgh will be the largest station in New Zealand.

Pacific Telephone Cable

A *Reuter* report from Los Angeles states that two British ships, the *Monarch* (G.P.O.) and the *Ocean Layer* (Submarine Cables, Ltd.) started work last week on laying the world's longest underwater cable for the American Telephone & Telegraph Company. The project, costing over $37 million, will provide a telephone connection over some 2,400 miles of the Pacific from Point Arena, north of San Francisco, to the island of Oahu, in the Hawaii group. The link will be about 150 miles longer than the transatlantic cable from Oban to Clarenville, Newfoundland. The laying of the cable is expected to be completed in the autumn. The *Monarch* will work from Oahu and the *Ocean Layer* from Point Arena.

Electrical Exports in June

The figures published in the Board of Trade returns show that the value of British electrical exports in June was £19,572,592, as compared with £21,031,355 for the preceding month and £18,985,413 for June last year. Despite fluctuations from month to month the total of £115,282,436 for the first six months of this year shows a considerable increase over that for January-June, 1956, when the total was £109,450,346. The monthly tables of electrical exports will be published in our next issue.

Electricity at the Great Yorkshire Show

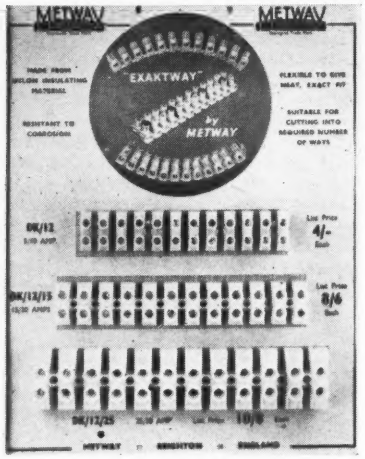
The joint display by the North Eastern and Yorkshire Electricity Boards at the Great Yorkshire Show occupied an area of 11,000 sq ft; of this, 1,200 sq ft was used to illustrate the part electricity plays in the conservation of crops. "In-Barn" hay drying using loose and baled hay, grain drying "in-silo" and "in-sack" were four of the applications demonstrated. The floors were constructed of weld-mesh, the air being blown by axial flow fans to which electric heater banks could be incorporated. The dairy, complete with milk coolers and sterilising equipment, created much interest, and the actual hatching of turkey and hen chicks in "Perspex" covered incubators attracted large crowds. The horticulture exhibit included soil warming, space heating, soil sterilising and plant irradiation appliances displayed in greenhouses and frames. The central part of the stand was utilised to display a comprehensive range of domestic electrical appliances for the farmhouse, and in

The domestic equipment display on the stand of the North Eastern and Yorkshire Electricity Boards at the Great Yorkshire Show

the small theatre incorporated in this section, demonstrations of appliances were given.

Terminal Strip Showcard

Metway Electrical Industries, Ltd., have made available for retailers and contractors an attractive blue coloured showcard, to which is affixed a sample of each of their "Exaktway" nylon



The Metway range of "Exaktway" nylon flexible terminal strips shown mounted on the new showcard

flexible terminal strips. The strips are in three sizes, 5/10 A, 10/20 A and 25/30 A. The showcard is being sold at the bare cost of the strips, i.e. £1 3s 2d.

Nuclear Powered Ships

In view of the current interest in nuclear propulsion of ships, Cammell Laird & Co. (Shipbuilders & Engineers), Ltd., and Babcock & Wilcox, Ltd., announce that they have been collaborating closely in this field since April, 1956.

The agreement between the two companies, which is not in any way exclusive, was to undertake feasibility studies and the development of designs in order to be able to offer complete nuclear powered ships. In view of the high capital cost of a nuclear installation, the nearest approach at the present time to economic competition with conventional power is, of course, the large oil tanker, with its specialised service and high use factor, and a study has recently been completed by the two companies for a 65,000 ton deadweight tanker, using a gas-cooled graphite-moderated reactor design developed from Calder Hall.

Diesel Generators for Liberia

An order for more than $250,000 has been obtained by the Brush Group from the Liberian Government. This is the first time Liberia has bought British electricity supply equipment—her existing diesel generators are American—and the order was obtained in the face of keen competition, especially from Switzerland. The order is for diesel-electric generating sets for the Monrovia city power station. The generating sets will each consist of KSS8 diesel engines made by Mirrlees, Bickerton & Day, Ltd., Stockport, and generators and switchgear from the Loughborough works of Brush Electrical Engineering Co., Ltd. The sets are rated at 1,290 kW at 400 r.p.m. generating at 2,400 V, 60 c/s.

Birlec Equipment for Atomic Development

Birlec, Ltd., has recently received several important orders for nuclear power stations. These include air and gas drying equipment for three nuclear power plants and a batch of eight special furnaces for the United Kingdom Atomic Energy Authority's Industrial Group headquarters.

For the experimental power project at Dounreay, the company is to supply air drying plant for the fast reactor sphere. This plant is being supplied to the order of Thermotank, Ltd., as part of the air treatment installation to be supplied by that company.

Other Birlec drying equipment, concerned with carbon dioxide gas, is to be installed at the nuclear power stations being built at Berkeley, Gloucestershire, by the A.E.I.-John Thompson Nuclear Energy Co., Ltd., and in the South of Scotland by the G.E.C.-Simon Carves Atomic Energy Group. For the Berkeley station the company is to supply eight adsorption dryers and dual heat exchangers, four dryers to operate continuously with each reactor. Four similar dryers are to be supplied for the South of Scotland station.

The eight Birlec furnaces for Risley will be of a special twin pot design with common heating and air circulation systems.

New S.E.B. Showrooms

The Southern Electricity Board opened new showrooms on Monday last at 50, High Street, Bognor Regis.

Teachers' Conference

About sixty members of the Association of Teachers of Domestic Subjects met on 13th July at Rough Rew, Dorking, the headquarters of the Surrey Sub-Area of the South Eastern Electricity Board, for an all-day conference, the objects of which were to provide an opportunity for teachers and the Board's demonstrators to meet socially, exchange ideas, and to review the Board's services to schools. The conference was opened by Mr. C. W. Smith, sub-area senior commercial assistant, who spoke of the services which the Board offers to schools.

Higher Postal and Telephone Charges

Increases in postal and telephone charges, to come into operation on 1st October, were announced by the Postmaster General last week. The inland letter rate will be raised from 2½d for 2 oz to 3d for 1 oz; postcards from 2d to 2½d; and newspapers from 2d to 2½d for 6 oz, with 1½d instead of 1d for each additional 6 oz. The charge for printed papers and samples will be 2d for 2 oz instead of 4 oz. There will also be increases in various other postal charges, including parcels and poundage on postal orders. Registration will cost 1s instead of 6d.

Annual telephone rents are to be standardised at £12 for residential and £14 for business subscribers, but the concession for shared service is increased from 30s to £2. "Free" calls are abolished and the local charge raised from 2½d to 3d (in call boxes the charge will remain at 4d). From 1st January the local charge will, however, apply to a larger area. The cost of having a telephone connected is to go up from £3 to £5 and rent will be payable on private switchboards as well as on extensions. Overseas telegrams will cost more.

At a Press conference Mr. Marples said that the Post Office had to find £30 million in 1957-58 and £33 million in 1958-59. Of that total of £63 million wage increases accounted for £58 million. This was the result of bringing Post Office wages into line with those in outside industry.

Cable for Railway Electrification

Following the announcement in the *Electrical Review* of 7th June, 1957, of the award by the Central Electricity Authority to W. T. Henley's Telegraph Works Co., Ltd., of the first cable contract for the supply at 25 kV for the electrification of British Railways, we now publish an illustration of the cable. Developed by Henley's, this is an oil-filled concentric cable, with 0·25 sq in inner and 0·21 sq in outer copper conductors, and a 12 mm

New 25 kV concentric oil-filled railway electrification cable

central oil duct, paper insulated, single lead sheathed, reinforced and protected with anti-corrosion finish.

New Radio Component Factories

Two new factories have recently been opened by the Carr Fastener Co., Ltd., one at Worksop and the other at Sutton-in-Ashfield. Last week, at the invitation of the Benjamin Electric, Ltd., their sole agents, we had the opportunity of visiting both of these premises, where many of the "Cinch" components and assemblies for radio, electronics and television are produced.

The factory at Shire Oaks Road, Worksop, covers over four acres and the site allows for considerable expansion. Nearly all the components

View of the automatic eyeletting section of the Carr Fastener Co.'s Worksop factory

are hand assembled and cover a wide range including valve holders and sockets, T.V. aerial plugs and sockets, miniature and signal lamp holders, etc. The single-storey building has a large glass frontage giving excellent light conditions both for the works and offices. Fluorescent lighting is installed throughout and "Ventaxia" ventilation and thermostatically controlled heating, together with an up-to-date canteen provide the best working conditions for the staff.

The new moulding plant at Sutton-in-Ashfield follows the general lines of the one at Worksop and has been built to increase the production of this unit by some 250 per cent. In this factory, 26 of the latest types of injection moulding machines are installed and a staff of 135 produce most of the mouldings required by the company.

Both of the new factories have been designed for flexibility of production lines and for rapid shipment of goods.

G.E.C. Export Guide

In publishing the July issue of its Export Guide the General Electric Co., Ltd., states that the prospects for British goods abroad continue favourable. The Guide gives the latest available information on export opportunities for thirty-six major groups of British manufactured products in thirty-four important world markets. Current export prospects in the July issue of the Guide show that the position is good in sixteen countries, improving in seven, deteriorating in eight and bad only in three.

Status and Responsibilities of Purchasing Officers

Following the pilot survey carried out in 1955 the Purchasing Officers' Association has now conducted a comprehensive survey into its members' status and responsibilities, the results being summarised in a 12-page booklet which it has recently issued. More than half the members of chief purchasing officer status who completed the questionnaire form place orders for over £500,000 each year and 70 per cent of them are responsible direct to their boards. The contents also include information regarding the titles of members, the average number of staff controlled in purchasing departments of companies of different sizes spending from up to £500,000 to over £5 million per annum, and centralisation of purchasing. Other points covered are the purchasing of plant, market information and departmental statistics and costs. Copies of the booklet may be obtained free of charge from the secretary of the Association, Wardrobe Court, 146a, Queen Victoria Street, London, E.C.4.

Small American Reactor

A small reactor developed for the United States Army to produce power at remote military installations has successfully completed a 700-hour test, the Atomic Energy Commission announced recently in Washington. The reactor was designed for Army sites where the cost or difficulty of obtaining conventional fuel makes nuclear power competitive.—*Reuter.*

Son et Lumière Displays at Greenwich

The Son et Lumière displays at Greenwich, announced by the Minister of Works on 25th June, will start on 1st August. The voice of Sir Laurence Olivier will be heard in the major role of the special narrative prepared for the production. This night-time spectacle of sound and light is being introduced to London by the *Daily Telegraph* on behalf of the Ministry of Works. It will be centred on the Queen's House, the National Maritime Museum and the Royal Naval College. M. Paul Robert-Houdin, who introduced Son et Lumière at Chambord in the Loire Valley in 1952, is in charge of the production at Greenwich Park. Work on the recording of narrative, dialogue and music, which will be reproduced through a stereophonic sound system, is completed. Meanwhile, thousands of yards of cable have been laid by the Ministry of Works to serve the special lighting for the spectacle.

Power Transformers for Hong Kong

Considerable local interest was aroused in Hong Kong recently by the arrival of a 28½-ton distribution transformer which was transported through the narrow streets of the central area on a heavy road trailer. The transformer, the first of three units to be ordered by the Hong Kong Electric Co., Ltd., from the General Electric Co., Ltd., of England, was unloaded from the Blue Funnel liner *Cyclops* on to a lighter and subsequently lifted on to the road trailer by one of the giant cranes at the Royal Naval Dockyard. For the journey from the dockyard to the substation site in Zetland Street it was necessary to close some of the streets to all other vehicles and to carry out temporary levelling operations at a road junction. The transformer is rated at 10,000 kVA with a voltage ratio of 22 kV/6·6 kV, and is fitted with an on-load tap-changing switch which enables the output voltage to be varied over the range of +5 per cent to −10 per cent. Two transformers of similar rating are now being built, and two further units rated at 7,500 kVA are on order.

Batti-Wallahs' Society

Members of the Batti-Wallahs' Society are reminded that the monthly luncheon will be held on Wednesday next (Connaught Rooms, W.C.2, 12.30 for 12.55 p.m.) when the guest speaker will be Sir Rex Hodges, J.P.

Dismantling Queensferry Power Station

F. C. Larkinson, Ltd., have been given the contract for the dismantling of the Queensferry power station in Flintshire, North Wales. The station was erected in 1915 at H.M. Factory Site, Queensferry, originally to generate electricity for the operation of plant for the manufacture of high explosives for the Ministry of Munitions. It was bought by the Chester Corporation in 1923, and ultimately handed over, on vesting day, to the Central Electricity Authority.

Electrical Aids for the Disabled

"Electricity Lends a Hand to the Disabled" is the theme of the Electrical Development Association's display at the exhibition held in conjunction with the Cripples Conference at the Caxton Hall, Westminster, which opened on Monday last. The part that electricity can play in improving the life of handicapped persons, especially those living at home and caring for themselves, is illustrated, and the great safety factor of carefully chosen electrical appliances is stressed. One section of the stand is given over

to the kitchen, and here there is a special bench, designed so that everything "comes to hand" from wheel chair position. An electric cooker, electric kettle, and a lightweight iron and powered food mixer for eliminating effort, are to be found in this section, together with an electric washing machine, spin dryer and sink water heater. The "Sleyride" electric indoor chair is shown in position, and indicates how a person forced to use a wheel chair can still work in the kitchen. An electric cooker for the blind is also displayed.

Electrical equipment for the bedroom includes an automatic tea-maker, a book holder, which turns the pages automatically, and electric blankets and heating pads. Examples of safe room heaters include one that switches itself off if knocked over, and a special light fitting which can be moved to any desired position in the vicinity of a wheel chair or other seat is also shown. A large photograph of the Harper electric carriage shows how electricity can help the disabled out-of-doors.

Anglo-American Research and Development Company

The Solartron Electronic Group, Ltd., Surrey, and the Rheem Manufacturing Co., New York, have formed a new company, Rheem-Solartron, Ltd., jointly owned by the two concerns, to carry out research and development work on radar simulation projects and other electronic devices.

Nuclear Research Equipment for Geneva

A consignment of nuclear research equipment was dispatched from the Trafford Park Works of the Metropolitan-Vickers Electrical Co., Ltd., recently, and was due to arrive in Geneva on 19th July. It formed part of a 50 MeV proton linear accelerator for the European Nuclear Research Centre (C.E.R.N.). The linear accelerator, when completed, will be 100ft long, and the item dispatched was a 40ft long 9-ton section of the steel vacuum tank. The equipment was carried on a lorry and trailer, and these were specially adapted to permit relative movement without involving the risk of distortion of the vacuum tank. On arrival at Tilbury, the lorry was driven direct on board the "drive-on, drive-off" ferry boat of the Transport Ferry Service, and the journey to Switzerland was continued without disturbing the load.

Equipment leaving the Metropolitan-Vickers Trafford Park Works en route for the European Nuclear Research Centre, Geneva

Communication Systems Manufacture

Last week we had the opportunity of visiting a private exhibition arranged by Standard Telephones & Cables, Ltd., at its New Southgate works to illustrate the wide range of communications and allied equipment manufactured in its various factories. Altogether, about a hundred items were on view, including both complete sets of equipment and individual components.

As would be expected, much of the equipment was of a highly specialised nature. Aircraft communications equipment formed a large part of the display and this included airborne radio teleprinter equipment for recording meteorological and navigational reports. Another interesting item was a radio doppler type muzzle velocity measuring equipment which is used by the Services for calibrating guns.

There was also a portable test set which is designed to measure current gain of p-n-p junction transistors used in common emitter configuration. Gains of up to 100 are measurable, together with an indication of the d.c. collector current with base open-circuited.

In the industrial field there was a ball-mill feed control designed to give automatic control and eliminate the need for employing skilled personnel having a highly developed sense of hearing. The control system is based on the amplitude of a pre-selected portion of the noise spectrum produced by the mill (assessed acoustically beforehand) and ensures that the feed is electronically adjusted to keep the selected noise level (not less than 70 phons) to within ±1 db.

Recent developments in telephone apparatus included electronic and transistorised exchange equipments which, in some cases, incorporated printed circuits and wrapped solderless joints. An interesting item in this field was the rocking armature receiver which has been adopted as standard by the G.P.O. for its new 700 type telephone. The rocking armature pivots on a small, high-energy permanent magnet set between a V-shaped yoke. A flared light alloy diaphragm is joined to the armature driving unit by a thin connecting rod. The essential characteristics are high sensitivity and an equalised response within ±3 db from 200 c/s to 3,500 c/s. It is light in weight and, therefore, suitable for very light headsets or microphones.

The display also embraced a wide range of components including valves, cathode ray tubes, capacitors, transistors, relays, quartz crystals, rectifiers and ferrite cored coils.

Trade Announcements

George Ellison, Ltd., announce the appointment of Mr. H. V. Stanton, B.Sc., as sales engineer for "Ellison" switchgear, motor control gear and hydraulic valves in the Surrey, Sussex and Kent areas. With the appointment of Mr. Stanton, rearrangements have been made in the company's south-east area sales and consultative service and the areas covered by the other sales engineers have been re-allocated as follows:—Mr. J. Russell-Smith (Essex, Norfolk, Suffolk, Hunts, Cambs, and Isle of Ely), Mr. R. J. Roy (Middlesex, Oxford, Bucks, Berks, Hants, and Isle of Wight) and Mr. F. W. Webb (Beds and Herts). Mr. Crowther will continue to act in a consultative capacity in Sussex, Kent, Hants, and the Isle of Wight, but will eventually concentrate on inner London areas, which are also shared between the other sales engineers mentioned above.

Harris & Sheldon (Electrical), Ltd., have enlarged their range of lighting fittings to cover cold cathode lighting by the absorption of the "Meico" range previously manufactured by Micramatic, Ltd. Production of the complete range has been transferred from Congleton to the main factory at Birmingham.

Taylor Tools & Supplies, Ltd., have appointed the following agents for their range of grinding and polishing machines:—Midlands: H. Sumner, Ltd., 45-47, Stour Street, Birmingham, 18 (telephone: Edgbaston 4541). Lancashire, Cheshire and North Wales: Mr. G. Clarke, 64, Beverley Road, Manchester, 14 (telephone: Rusholme 8212). London and Home Counties: Power Tools & Accessories, Ltd., 37, Sheen Road, Richmond, Surrey (telephone: Richmond 3425).

Giles (Electrical Engineers), Ltd., have taken over the business formerly known as **Taylor Radio & Television,** at 28, Bridlington Road, Oxhey, Hertfordshire.

"Servis" Domestic Appliances (Wilkins & Mitchell, Ltd.) announce that Mr. J. Clare has been appointed manager of their service depot at 448, Shore Road, Belfast.

The **Igranic Electric Co., Ltd.,** has moved into new offices at 4, Albert Square, Manchester, which provide more spacious accommodation. The telephone number (Blackfriars 8033) remains unchanged.

GENERATION AND DEVELOPMENT

Output Rise Slackens

The increase of only 1 per cent in electricity generated by the Central Electricity Authority, the North of Scotland Hydro-Electric Board and the South of Scotland Electricity Board in the first six months of this year (see Table 1) compares with increases of 9 per cent in the corresponding half of 1956 and 11·8 per cent in the period January-June, 1955. June was the third month since the beginning of the year in which the output actually fell below last year's level, though in May there was a rise of 13·6 per cent.

Plant is now being installed at an annual rate of well over 2,000 MW. With an additional 392 MW commissioned last month, the total capacity was increased to 25,354 MW.

New plant was installed by the C.E.A. last month in ten stations, as follows:—Tilbury "A," 60 MW English Electric set and 60 MW John Thompson boiler; Meaford "B," 60 MW B.T.H. set; Castle Donington, 100 MW Metropolitan-Vickers set; Hams Hall "C," 60 MW G.E.C. set; Deptford East, 52·5 MW Metrovick set; Brighton "B," 34 MW Babcock & Wilcox boiler; Goldington, 30 MW B.T.H. set; Lincoln, 13 MW Richardsons Westgarth boiler; Chadderton "B," 38 MW Simon-Carves boiler; and Connah's Quay, 30 MW C. A. Parsons set.

In addition to public supply, 5,279 million kWh was generated by industry in the first 26 weeks of this year, an increase of 6·4 per cent. Figures for the principal industries, in million kWh, with the percentage variations in parentheses, were as follows:—Chemicals, 1,648 (+17·3); iron and steel, 1,122 (+1·7); engineering, including non-ferrous metal manufacture, 658 (−0·3); textiles, leather and clothing, 339 (−0·7); food, drink and tobacco, 137 (+16·3); paper, 1,086 (+4·6); and other industries, 222 (−5·1). Railways, transport undertakings, coal mines, gasworks and petroleum refineries are not included.

Table 2 analyses the sales of Electricity Boards. The national figures show a decrease over June, 1956, of 1·9 per cent, but when corrected for weather conditions and working days, the increase is 5·9 per cent.

TABLE 1.—ELECTRICITY GENERATED AND SENT OUT FOR PUBLIC SUPPLY

	Fuel consumed Thousand tons			kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.r.) MW
	Coal	Coke and Breeze	Oil	Steam	Water power	Total		
Central Electricity Authority ...	2,854	56	27·8	5,559	3	5,567	5,208	23,130
North of Scotland H.E.B. ...	10	—	1·1	14	67	86	84	831
South of Scotland E.B. ...	206	5	0·2	392	6	398	376	1,393
Total for June, 1957	3,070	61	29·1	5,965	76	*6,051	5,668	25,354
Corres. total for June, 1956 ...	3,143	70	35·7	6,049	83	6,142	5,756	23,013
Inc. or dec., per cent	−2·3	−13·3	−18·3	−1·4	−8·1	−1·5	−1·5	+10·2
Total to date (6 months), 1957 ...	22,738	458	160·0	43,967	1,090	45,124	42,418	
Total for corres. 6 months of 1956	22,928	491	207·3	43,871	718	44,678	41,988	
Inc. or dec., per cent	−0·8	−6·8	−22·8	+0·2	+51·8	+1·0	+1·0	

* The total figure includes generation by other methods amounting to 10 million kWh.

TABLE 2.—ELECTRICITY SENT OUT BY AREA BOARDS FOR THEIR CONSUMERS

Area Board	Totals for June (million kWh)			Twelve Months' Totals Ended 30th June (million kWh)		
	1956	1957	Inc. or Dec. %	1956	1957	Inc. or Dec. %
London	444·6	419·9	− 5·6	6,801·1	6,916·5	+ 1·7
South Eastern	302·3	291·0	− 3·7	4,277·4	4,443·0	+ 3·9
Southern	366·6	360·5	− 1·7	5,124·0	5,499·3	+ 7·3
South Western	195·2	193·3	− 1·0	2,625·9	2,777·0	+ 5·8
Eastern	482·4	472·7	− 2·0	6,792·1	6,164·7	+ 5·5
East Midlands*	434·7	423·1	− 2·7	5,835·6	6,118·5	+ 4·8
Midlands*	556·9	530·9	− 4·7	7,612·4	7,767·3	+ 2·0
South Wales*	342·4	354·8	+ 3·6	4,427·4	4,623·8	+ 4·4
Merseyside and N. Wales* ...	346·9	353·9	+ 2·0	4,565·3	4,812·8	+ 5·4
Yorkshire*	575·5	564·0	− 2·0	7,587·3	7,981·8	+ 5·2
North Eastern*	333·2	330·9	− 0·7	4,364·3	4,613·7	+ 5·7
North Western*	601·5	584·1	− 2·9	8,082·2	8,277·1	+ 2·4
Total all Area Boards	4,982·2	4,879·1	− 2·1	68,095·0	70,995·5	+ 4·3
Direct Supplies by Central Authority	175·8	181·6	+ 3·3	2,102·6	2,259·9	+ 7·5
Grand Total	5,158·0	5,060·7	− 1·9	70,197·6	73,255·4	+ 4·4
Mainly Industrial Areas*	3,191·1	3,141·7	− 1·5	42,474·5	44,195·0	+ 4·1
Mainly Non-Industrial Areas ...	1,791·1	1,737·4	− 3·0	25,620·5	26,800·5	+ 4·6

* Those in which industrial consumers took over 50% of the total sales in the preceding financial year.

Eastern Board's Second Five-Year Rural Programme Completed

With the connection last week of Commodore Mills' farm at Ashfield Place, near Debenham, in Suffolk, the Eastern Electricity Board completed its second five-year rural electrification programme in just over 4¼ years. There are now more than 22,300 farms obtaining their electricity from the Board, compared with about 10,000 when the supply industry was nationalised in 1948.

Supplies of electricity to farms represent, of course, only a proportion of the new rural supplies which are provided every year. During the Board's first nine years, no fewer than 1,265 additional villages and hamlets have been connected to the supply. The rate at which this work has been carried out would have been even greater had there not been the inevitable slowing down caused by the restrictions on capital investment.

Providing there are no further restrictions on capital investment for such works as rural electrification the Board hopes that it will be possible to go ahead with the third five-year programme and make electricity available as quickly as possible to those who are still without a supply.

OVERSEAS

Hydro-Electric Development in Nigeria

Subject to annual review, the Northern Region Development Corporation of Nigeria has allocated £500,000 for the purchase of share capital in a company to be formed for the purpose of developing hydro-electric power in the Shiroro Gorge.

The money has been allocated on the understanding that the proposed company is to consist of the Electricity Corporation, the Federal Government, the Northern Regional Government and the Northern Region Development Corporation. In accordance with the circumstances prevailing each year, it will be decided whether the money should be withdrawn, reduced or increased.

Earlier this year a firm of British consulting engineers began investigations into the possibility of damming the Shiroro Gorge, some 55 miles from Kaduna, the Northern Regional capital, to provide electrical power for the new industrial areas at Kaduna and Zaria. It has been estimated that the Kaduna River is capable of producing over 400 million kWh in a year of average rainfall. A very high dam would have to be built to provide sufficient storage of water.

DOMESTIC ELECTRICAL EQUIPMENT

LOW TEMPERATURE HEATERS

FROM the safety aspect, particularly where young children or elderly people are concerned, the low temperature form of heating is ideal; not only are the heating elements completely enclosed but the actual surface temperature of the outside casing or cabinet of the heater is never sufficient to cause burning.

Among the many variants of this form of heating, the convector heater is perhaps the most popular. A wide variety of designs are available and many of the models listed in the following survey, besides their primary use as room heaters, are also pleasing items of furniture. Floor standing, wall mounting or wall inset fixing models are available. Some also incorporate a small motor-driven fan to assist the circulation of the heated air.

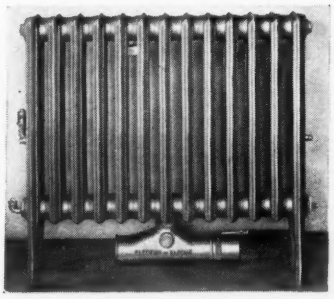
As the thermal capacity of convector heaters is low, they heat up within a short space of time, upwards of 90 per cent of the heat output being by convection. The loading may be anything from 750 W to 3 kW and an even level of temperature as well as economical use of electricity is ensured, in most cases, by thermostatic control. With the radiator types, although the full heating effect is not at first available after switching on, it will be appreciated that due to their residual heat, especially with the oil-filled models, they do continue to emit heat after being switched off. Few new models have appeared on the market since our last survey and prices remain at much the same level as then.

Among the new convector heaters listed is the A.E.G. "Airotherm" (Welmec Corporation), a portable 2 kW heater with rubber wheels, and the "Bournemouth," a contemporary styled heater in pastel colours or wood finishes announced by H.V.E. (Electric), Ltd. An energy regulator is incorporated in this model, which is available in 1, 2 and 3 kW sizes.

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
ARGOSY ENGINEERING, LTD., Hertford Road, Barking, Essex.	"Argosy"	Portable	24×20×8½	2 kW	Thermostatic	Steel	Old gold stoved enamel	£8 0 6	£3 9 6
P. W. BAKER & SONS (SALES), LTD., Fontwell Avenue, Eastergate, Chichester, Sussex.	"Mayhurst"	Portable	11×11 dia.	2¼ kW	3-heat; thermostatic	Steel	Hammer bronze, red, yellow or blue	£11 19 9	£5 5 3
BELLING & CO., LTD., Bridge Works, Enfield, Middx.	"Champion" 91A	Portable	22⅞×9¾ dia.	750 W	2-heat	Steel and cast iron	Silver bronze	£3 12 6	£1 11 11
	"Champion" 92A	Portable	23⅞×10½ dia.	1·5 kW	2-heat	Steel and cast iron	Silver bronze	£4 5 0	£1 17 5
	"Champion" 83A	Portable	24½×13 dia.	2¼ kW	3-heat	Steel and cast iron	Silver bronze	£5 12 6	£2 9 6
	"Radiant-Convector" 750	Portable	26×20½×9¾	1 kW radiant and 1·5 kW convection	3-heat	Steel	Silver bronze	£15 0 0	£6 12 0
	"Convector" 751B	Portable	24×20½×8	1 kW	2-heat	Steel	Silver bronze	£7 6 0	£3 4 3
	"Convector" 752B and 752AB	Portable	24×36×8	2 kW (752B) 3 kW (752AB)	3-heat	Steel	Silver bronze	£11 10 0 (752B) £12 5 0 (752AB)	£5 1 3 (752B) £5 7 10 (752AB)
	"Zephyr" 851	Portable	19¼×22¼×6¼	1 kW	2-heat (thermostat extra)	Steel	Old gold and bronze	£7 6 0	£3 4 3
	"Zephyr" 852	Portable	22¼×33×6¼	2 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£11 10 0	£5 1 3
	"Zephyr" 853	Portable	22¼×45×6¼	3 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£15 0 0	£6 12 0
	"Warm Air Circulator" 85	Wall fixing	23½×6×5	750 W	2-heat	Steel	Silver bronze	£4 15 0	£2 1 10
	"Warm Air Circulator" 86	Wall fixing	23½×12×5	1·5 kW	2-heat	Steel	Silver bronze	£7 10 0	£3 6 0
	"Warm Air Circulator" 87	Corner fixing	23½×9×6½	750 W	2-heat	Steel	Silver bronze	£5 0 0	£2 4 0
	"Handy Heater" 952	Floor mounting	12×4½ dia.	250 W	—	Steel and cast iron	Bronze	£1 15 0	£0 15 5

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
BELLING & CO., LTD., Bridge Works, Enfield, Middx. (continued)	" Zephyr " 851F	Wall fixing	21×19¼×5¼	1 kW	2-heat (thermostat extra)	Steel	Old gold and bronze	£7 6 0	£3 4 3
	" Zephyr " 852F	Wall fixing	21×33×5¼	2 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£11 10 0	£5 1 3
	" Zephyr " 853F	Wall fixing	21×45×5¼	3 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£15 0 0	£6 12 0
	" Air Warmer " 961A	Wall or floor mounting	3¾×8×13¾	500 W	—	Cast iron	Black vitreous enamel	£2 0 0	£0 17 8
	" Air Warmer " 962A	Wall or floor mounting	3¾×8×18	1 kW	—	Cast iron	Black vitreous enamel	£2 10 0	£1 2 0
BENHAM & SONS, LTD., 66, Wigmore Street, London, W.1.	" Electro-Vapour " 4 PR	Semi-portable	22×21×5⅛	1 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	£18 5 0	£8 0 7
	" Electro-Vapour " 6 PR	Semi-portable	28×27×5⅛	1½ kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	£21 17 0	£9 12 3
	" Electro-Vapour " 7 PR and 7 PS	Semi-portable	28×31×5⅛ (7 PR) and 28×21×8½ (7 PS)	2 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	£24 0 0	£10 11 3
	" Electro-Vapour " 8 PS	Semi-portable	28×27×8½	2½ kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	£26 17 6	£11 16 6
	" Electro-Vapour " 9 PS	Semi-portable	28×33×8½	3 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	£29 5 0	£12 17 5
BERRY'S ELECTRIC, LTD., Touchbutton House, Newman Street, London, W.1.	" Raydair " 890/1	Portable or wall mounting	20×22½×7¼	1 kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£10 12 6	£4 13 3
	" Raydair " 890/1½	Portable or wall mounting	20×30½×7¼	1½ kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£13 15 6	£6 0 11
	" Raydair " 890/2	Portable or wall mounting	20×45×7¼	2 kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£21 5 0	£9 6 6

1. *Benham " Electro-Vapour " radiator*
2. *Berry's " Raydair " 890/2 heater*
3. *P. W. Baker & Sons " Mayhurst " space heater*
4. *Argosy Engineering 2 kW model*
5. *Belling " Zephyr " 1, 2 and 3 kW range*



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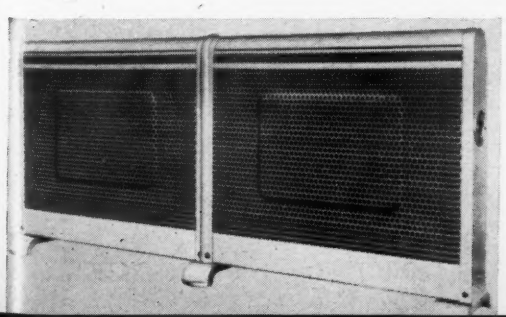

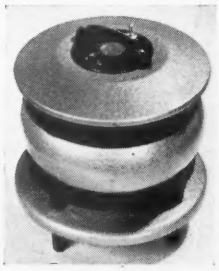

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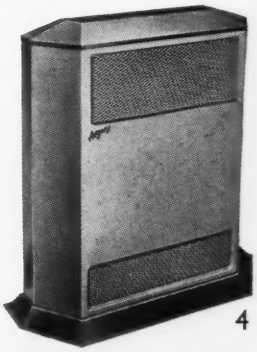

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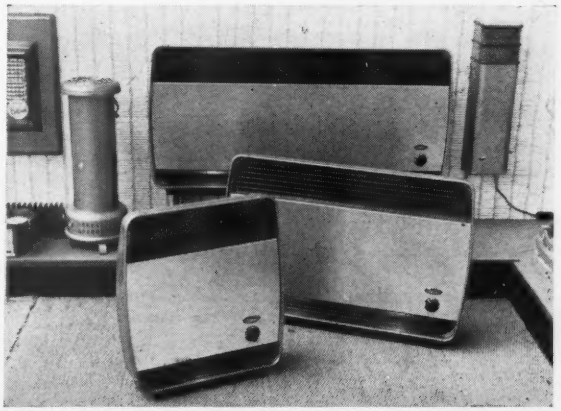

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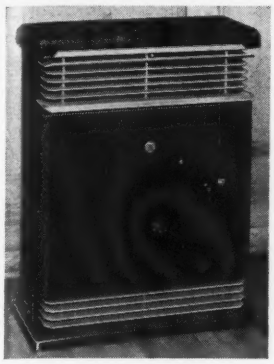
Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
BESCOL (ELECTRIC), LTD., 118, Parkfield Road, Saltley, Birmingham, 8.	244 and 245	Portable	28×18⅜×6½	2 kW	Switch (244) or thermostat (245)	Steel	Various colours	£6 17 0 (244) £8 14 0 (245)	£3 0 1 (244) £3 16 4 (245)
	"Contemporary" 270 and 272	Portable	28×18½×8	2 kW	Switch (270) or thermostat (272)	Steel	Shades of beige	£5 17 6 (270) £6 12 6 (272)	£2 10 10 (270) £2 17 4 (272)
BRITISH NATIONAL ELECTRICS, LTD., Newarthill, Motherwell, Lanarkshire.	P.20	Portable	24½×19½×8½	2 kW	Thermostatic	Steel	Black crackle or hammered grey, flame gold louvres	£11 0 0	£4 16 6
	P.15	Portable	22½×19½×8½	1½ kW	Thermostatic	Steel	Black crackle or hammered grey, flame gold louvres	£7 15 0	£3 8 0
CENTURY CONVECTORS, LTD., Waterloo Road, Clitheroe, Lancs.	A.1	Portable	21×25¾×10	3 kW	3-heat rotary switch and thermostat	Steel plate and vitreous cast iron	Vitreous enamel	£20 3 0	£8 14 6
	B.1	Portable	21×13×10	1⅓ kW	Two tumbler switches and thermostat	Steel plate and vitreous cast iron	Vitreous enamel	£12 11 3	£5 8 9
E. K. COLE, LTD., Thermovent Heating, 5, Vigo Street, London, W.1.	FR1 and FRC1	Portable	23×16½×9½	1 kW	None (FR1) thermostatic (FRC1)	Plastic	Polished walnut (black, ivory, beige or red 15s extra plus 6s 8d P.T.)	£8 10 0 (FR1) £10 0 0 (FRC1)	£3 14 8 (FR1) £4 7 9 (FRC1)
	FR2 and FRC2	Portable	23×25½×9½	2 kW	Half-heat (FR2) thermostatic (FRC2)	Plastic	Polished walnut (black, ivory, beige or red 22s extra plus 9s 8d P.T.)	£11 10 0 (FR2) £12 10 0 (FRC2)	£5 0 11 (FR2) £5 9 9 (FRC2)
	SR1 and SRC1	Portable or wall fixing	23×15½×8¾	1 kW	None (SR1) thermostatic (SRC1)	Steel	Light bronze stoved enamel	£7 15 0 (SR1) £9 5 0 (SRC1)	£3 8 1 (SR1) £4 1 3 (SRC1)
	SR2 and SRC2	Portable or wall fixing	23×24½×8¾	2 kW	Half-heat (SR2) thermostatic (SRC2)	Steel	Light bronze stoved enamel	£10 0 0 (SR2) £11 0 0 (SRC2)	£4 7 9 (SR2) £4 16 7 (SRC2)
	SR3 and SRC3	Portable or wall fixing	23×24½×8¾	3 kW	Half-heat (SR3) thermostatic (SRC3)	Steel	Light bronze stoved enamel	£11 0 0 (SR3) £12 0 0 (SRC3)	£4 16 7 (SR3) £5 5 4 (SRC3)
	B1 and BC1	Inset	22½×14⅜×1⅜ (panel) 18½×12⅜×5½ (recess)	1 kW	External switch required (B1) thermostatic (BC1)	Plastic panels, steel grilles	Walnut or black panels, gold enamelled grilles	£10 0 0 (B1) £11 10 0 (BC1)	£4 7 9 (B1) £5 0 11 (BC1)
	B2 and BC2	Inset	22½×23½×1⅜ (panel) 18½×21×5½ (recess)	2 kW	External switch required (B2) thermostatic (BC2)	Plastic panels, steel grilles	Walnut or black panels, gold enamelled grilles	£12 7 6 (B2) £13 15 0 (BC2)	£5 8 8 (B2) £6 0 8 (BC2)
	MRL 75, 75/S and 75/TC	Wall mounting	20×13⅞×6	750 W	None (75), on/off switch (75/S), thermostatic (75/TC)	Steel	Light bronze stoved enamel	£7 10 0 (75) £7 18 3 (75/S) £8 15 0 (75/TC)	£3 5 10 (75) £3 9 6 (75/S) £3 16 10 (75/TC)
	MRL 1, 1/S and 1/TC	Wall mounting	20×13⅞×6	1 kW	None (1), on/off switch (1/S), thermostatic (1/TC)	Steel	Light bronze stoved enamel	£7 10 0 (1) £7 18 3 (1/S) £8 15 0 (1/TC)	£3 5 10 (1) £3 9 6 (1/S) £3 16 10 (1/TC)
	MRL 15, 15/S, 15/C and 15/TC	Wall mounting	20×22⅛×6	1⅓ kW	None (15), on/off switch (15/S), 3-heat and off switch (15/C), thermostatic (15/TC)	Steel	Light bronze stoved enamel	£10 10 0 (15) £10 18 3 (15/S) £11 8 0 (15/C) £11 15 0 (15/TC)	£4 12 2 (15) £4 15 10 (15/S) £5 0 1 (15/C) £5 3 2 (15/TC)
	MRL 2, 2/S, 2C and 2/TC	Wall mounting	20×22⅛×6	2 kW	None (2), on/off switch (2/S), 3-heat and off switch (2/C), thermostatic (2/TC)	Steel	Light bronze stoved enamel	£10 10 0 (2) £10 18 3 (2/S) £11 8 0 (2/C) £11 15 0 (2/TC)	£4 12 2 (2) £4 15 10 (2/S) £5 0 1 (2/C) £5 3 2 (2/TC)
	RGP1	Radiant glass wall panel	21⅛×30½×3	1 kW	External switch required, built-in switch available to order	Armour plate glass	Light bronze frame	£10 15 6	£4 14 6



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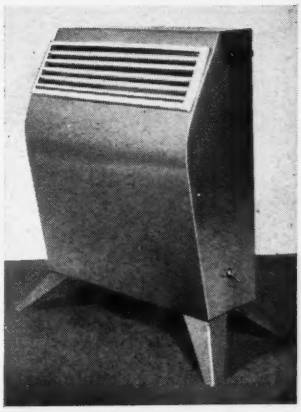

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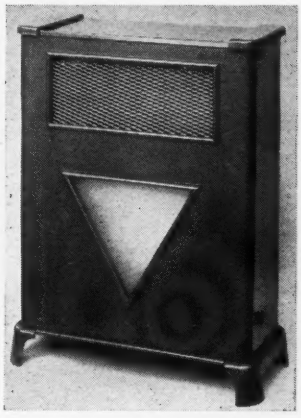
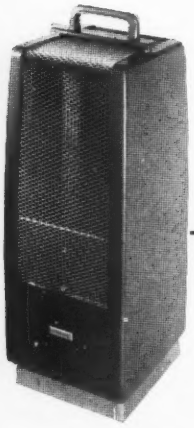


6. British National Electrics P.20 2 kW convector
7. Crosslands 900/2 convector
8. Dexray model C.22 convector
9. Bescol model 272 "Contemporary" heater
10. E. K. Cole "Thermovent" FRC.1 model
11. Cranmer & Cheshire "Nichro 444" illuminated convector

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
CRANMER & CHESHIRE, LTD., Steward Street, Spring Hill, Birmingham, 18.	"Nichro" 444	Portable	25×20×8½	2 kW	Half heat switch	Steel, glass panel	Gold bronze, illuminated glass panel	£10 15 8	£4 14 11
CROSSLANDS (RUGELEY), LTD., 55, Ebury Street, London, S.W.1.	900/1	Portable	22½×23½×3½–5	1 kW	—	Steel	Old gold or antique bronze	£6 12 6	£2 17 4
	900/2	Portable	22½×23½×3½–5	2 kW	Half-heat switch or variable thermostat	Steel	Old gold or antique bronze	£8 0 0 (switched) £9 5 0 (thermostat)	£3 9 3 (switched) £4 0 1 (thermostat)
	900/3	Portable	22½×23½×3½–5	2 kW	Three-heat switch	Steel	Old gold or antique bronze	£8 18 0	£3 17 1
DEXRAY ENGINEERING CO., LTD., 34, Ardwick Green South, Manchester, 13.	C.20	Portable	25×18×6	2 kW	On/off switch	Steel	Stove enamelled	£7 13 4	£3 9 0
	C.22	Portable	25×18×8	2 kW	On/off switch	Steel	Stove enamelled	£7 18 0	£3 11 0
	C.20/W	Wall mounting	23×18×7½	2 kW	On/off switch	Steel	Stove enamelled	£7 18 0	£3 11 0
DIMPLEX, LTD., Millbrook, Southampton.	A.38	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) ×26×7½ (feet), 3½ (brackets) or 12 (castors)	500 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£9 10 0	£4 3 3
	B.48	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) ×26×7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£11 10 0	£5 1 0

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
DIMPLEX, LTD., Millbrook, Southampton. *(continued)*	B.310	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 31½ × 7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£11 10 0	£5 1 0
	B.216	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	14½ (+2 with feet) × 47½ × 7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£12 0 0	£5 5 3
	C.412	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 36½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£13 10 0	£5 18 6
	C.220	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	14½ (+2 with feet) × 57⅜ × 7½ (feet), 3½ (brackets) or 12 (castors)	1 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£14 10 0	£6 7 3
	ER.316	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 47¼ × 7½ (feet), 3½ (brackets) or 12 (castors)	1¼ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£15 10 0	£6 16 0
	D.416	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 47½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1⅜ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£17 10 0	£7 13 6
	D.320	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 57⅜ × 7½ (feet), 3½ (brackets) or 12 (castors)	1⅜ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£17 10 0	£7 13 6
	E.420	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 57⅜ × 7½ (feet), 3½ (brackets) or 12 (castors)	2 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£21 10 0	£9 8 9
	100	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3 with feet) × 21½ × 6 (feet) or 12 (castors)	1 kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£15 10 0	£6 16 0
	140	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3 with feet) × 27½ × 6 (feet) or 12 (castors)	1½ kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£19 10 0	£8 11 0
	180	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3 with feet) × 34½ × 6 (feet) or 12 (castors)	2 kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£24 10 0	£10 15 0



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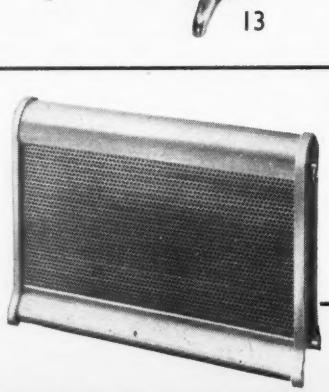

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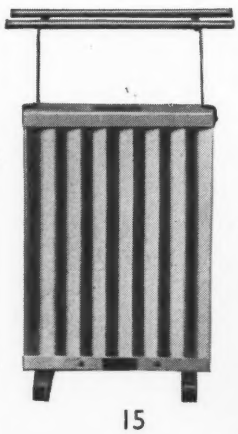

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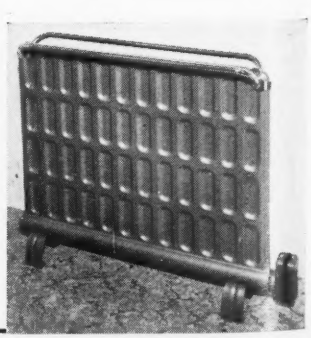

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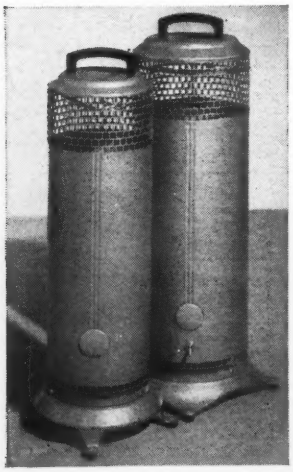
12. *Frost "Sunhouse" convector*
13. *Falk, Stadelmann "Caprice" panel convector*
14. *Falkirk Iron Co.'s model 206*
15. *Thomas Dryden "Airo" 500 W radiator*
16. *Dimplex C.412 radiator fitted with towel rail*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
DIMPLEX, LTD., Millbrook, Southampton. *(continued)*	ETC.210	Panel, oil-filled: supplied with feet or wall brackets	14⅜×30½×2¾ (brackets) or 5¾ (feet)	450 W	Excess temperature cut-out	Sheet steel	Stoved enamel, eight colours	£6 7 6	£2 16 0
THOS. DRYDEN & SON, LTD., Grimshaw Street, Preston.	"AIRO-S" ARO/500/S and ARO/750/S	Portable	18½×13½×2	500 W and 750 W	Switch	Steel	Cream, silver, green, brown, grey and white	£3 12 6 (500 W) £3 17 6 (750 W)	£1 11 10 (500 W) £1 14 0 (750 W)
	"AIRO-S" ARO/1000/S and ARO/1500/S	Portable	18½×27×2	1 & 1½ kW	Switch	Steel	Cream, silver, green, brown, grey and white	£5 19 0 (1 kW) £6 5 0 (1½ kW)	£2 12 2 (1 kW) £2 14 10 (1½ kW)
	"AIRO-LS" ARO/250/LS, ARO/500/LS and ARO/750/LS	Portable, Low surface temperature only	18½×13½×2 (250 W) 18½×27×2 (500 and 750 W)	250 W 500 W and 750 W	Switch	Steel	Cream, silver, green, brown, grey and white	£3 12 6 (250 W) £5 15 0 (500 W) £5 19 0 (750 W)	£1 11 10 (250 W) £2 10 5 (500 W) £2 12 2 (750 W)
DULRAE, LTD., Griffin Lane, Aylesbury, Bucks.	"Medrae" CR	Panel, wall or ceiling mounting	11¾×11¾×¼	80 W	Thermostatic	Non-metallic	Grey/brown	£1 6 8	£0 11 8
	"Medrae" CS	Panel, wall or ceiling mounting	23¾×11¾×¼	175 W	Thermostatic	Non-metallic	Grey/brown	£1 15 0	£0 15 4
	"Medrae" CT	Panel, wall or ceiling mounting	23¾×15¾×¼	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 17 7
	"Medrae" CU	Panel, wall or ceiling mounting	23¾×23¾×¼	425 W	Thermostatic	Non-metallic	Grey/brown	£2 12 4	£1 2 11
	"Medrae" CV	Panel, wall or ceiling mounting	31¾×11¾×¼	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 17 7
	"Medrae" CW	Panel, wall or ceiling mounting	31¾×23¾×¼	550 W	Thermostatic	Non-metallic	Grey/brown	£3 5 0	£1 8 6
	"Medrae" CX	Panel, wall or ceiling mounting	47¾×7¾×¼	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 17 7
	"Medrae" CY	Panel, wall or ceiling mounting	47¾×11¾×¼	400 W	Thermostatic	Non-metallic	Grey/brown	£2 12 4	£1 2 11
	"Medrae" CZ	Panel, wall or ceiling mounting	47¾×23¾×¼	850 W	Thermostatic	Non-metallic	Grey/brown	£4 9 4	£1 19 2
ELECTROWAY HEATERS, LTD., Rosebery Street, Loughborough.	C.2 and C.21 (illuminated)	Portable	30×21×6	2 kW	Single switch	Steel	Bronze, chromium grille	£10 0 0 (C.2) £10 14 0 (C.21)	£4 8 0 (C.2) £4 14 2 (C.21)
	C.3 and C.31 (illuminated)	Portable	30×21×6	3 kW	Two switches	Steel	Bronze, chromium grille	£11 3 6 (C.3) £11 15 6 (C.31)	£4 18 3 (C.3) £5 3 7 (C.31)
	441	Portable	22×18×6	1 kW	Single switch	Steel	Gold bronze	£6 10 0	£2 17 2
	442	Portable	30×22½×6	2 kW	Two half-heat switches	Steel	Gold bronze	£10 7 6	£4 11 3
	443	Portable	30×22½×6	3 kW	Two half-heat switches	Steel	Gold bronze	£10 17 6	£4 15 8
FALK, STADELMANN & CO., LTD., 91, Farringdon Road, London, E.C.1.	"Caprice" U.95715	Portable panel	20½×22⅜×3⅜	2 kW	Step	Steel	Vitreous enamelled in six contemporary colours. Chromium feet and band	£10 4 4	£4 9 8
FALKIRK IRON CO., LTD., P.O. Box No. 4, Falkirk.	"Falco" 206	Portable	17¾×25½×6½	1 kW	Wired direct to plug	Steel	Stoved enamel, various colours	£6 5 6	£2 15 1
H. FROST & CO., LTD., Fieldgate, Walsall.	"Sunhouse" 5075	Portable	22½×8×8	¾ kW	No switch. Suitable for a.c./d.c. supply	Pressed steel	Copper bronze	£4 9 0	£1 18 7
	"Sunhouse" 5100	Portable	22½×8×8	1 kW	Half or full-heat a.c. switch	Pressed steel	Copper bronze	£4 12 0	£1 19 10
	"Sunhouse" 5200 and 5201	Portable	22½×16×8	2 kW	Half or full-heat a.c. switch (5200) Thermostatic (5201)	Pressed steel	Copper bronze	£6 10 10 (5200) £7 10 0 (5201)	£2 16 8 (5200) £3 5 0 (5201)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
G.B.M. (ELECTRICAL) BIRMINGHAM, LTD., 439, Moseley Road, Birmingham, 12.	P.1	Panel oil-filled	27½×21½×2	500 W	Thermostatic	Pressed steel	Hammered gold	£9 5 0	£4 1 3
	P.2	Panel oil-filled	27½×28⅝×2	750 W	Thermostatic	Pressed steel	Hammered gold	£11 10 0	£5 0 10
	P.3	Panel oil-filled	27½×35⅝×2	1 kW	Thermostatic	Pressed steel	Hammered gold	£13 10 0	£5 18 6
	P.4	Panel oil-filled	27½×49⅝×2	1½ kW	Thermostatic	Pressed steel	Hammered gold	£16 17 6	£7 8 1
	P.5	Panel oil-filled	33½×61⅝×2	2 kW	Thermostatic	Pressed steel	Hammered gold	£21 10 0	£9 8 8
	C.1	Column oil-filled	18 (+2 for castors) ×21×5	500 W	Thermostatic	Steel	Hammered gold	£9 17 6	£4 6 8
	C.2	Column oil-filled	24 (+2 for castors) ×24½×5	1 kW	Thermostatic	Steel	Hammered gold	£15 10 0	£6 16 0
	C.3	Column oil-filled	24 (+2 for castors) ×35½×5	1½ kW	Thermostatic	Steel	Hammered gold	£19 10 0	£8 11 0
	C.4	Column oil-filled	24 (+2 for castors) ×44×5	2 kW	Thermostatic	Steel	Hammered gold	£24 10 0	£10 15 0
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2.	D.2802	Portable	27×17×7	1 kW	On-off switch	Steel	Hammered bronze	£5 5 0	£2 6 1
	D.2804	Portable	27×23×7	2 kW	Thermostatic	Steel	Hammered bronze	£8 5 0	£3 12 5
GILLOTT ELECTRO APPLIANCES, LTD., Chalford, Nr. Stroud, Gloucester.	" Chalford "	Portable	24×7 dia.	1 kW	Half-heat switch	Steel	Hammered bronze	£3 12 6	£1 11 11
	" Gloucester "	Portable	25×8¼×8¼	1½ kW	Half-heat switch	Steel	Hammered bronze	£4 4 0	£1 16 9
	" Cotswold "	Portable wall mounting fan heater	13½×11×7	1½ kW	Fan or element switch	Steel	Grey	£6 18 9	£3 0 11
	" Newday "	Free standing	23×18×9	Fan 1½ kW, convection 3 kW	Two-circuit switch, automatic time-switch	Steel	Dove grey, rich cream or venetian red	£20 10 0	£8 19 11
GRUBB ENGINEERING CO., LTD., 100, Mary Street, Birmingham, 12.	" Grubb " Convector	Portable (castors extra)	25×18×8	2 kW	Half-heat switch	Steel	Hammered gold lustre	£6 5 0 £6 10 0 (castors)	£2 14 10 £2 17 0 (castors)
	" Grubb " Radiators	Oil-filled " Dome "	23×32 to 28⅛×75⅛	500 W to 2 kW	Thermostatic	Steel	Hammered gilt or cream	£9 10 0 to £25 0 0	£4 3 3 to £10 19 4
	" Grubb " Radiators	Oil-filled castor	23×32 to 28⅛×75⅛	500 W to 2 kW	Thermostatic	Steel	Hammered gilt or cream	£10 12 6 to £25 10 0	£4 13 2 to £11 3 9
L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, London, W.C.2.	LGH.452	Portable	28⅛×12×8¼	1 kW	—	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£4 19 6	£2 3 8
	LGH.453S	Portable	28⅛×14×8¼	2 kW	Switch	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£6 6 0	£2 15 3

17. *Gillott " Chalford " (left) and " Cotswold " portable heaters*
18. *G.B.M. oil-filled panel type radiator*
19. *Heatovent console convector*
20. *Heatrae floor mounting convector*



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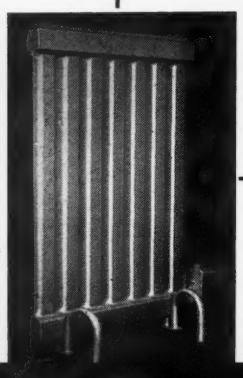

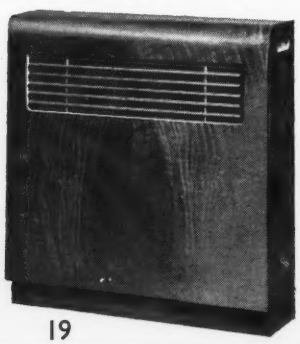

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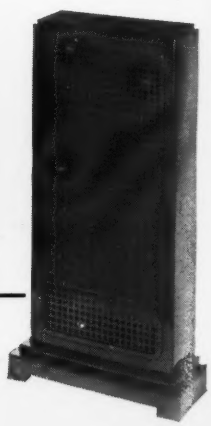

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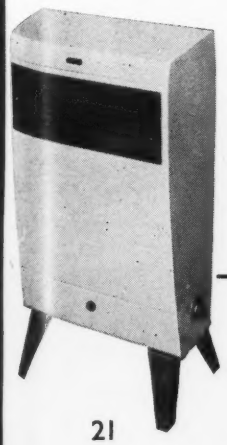
Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, London, W.C.2. *(continued)*	LGH.454T	Portable	28¼ × 14 × 8¼	2 kW	Thermostatic	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£6 12 0	£2 17 11
	"Sunray" LGH.451	Portable	21 × 13 × 6	1 kW	—	Sheet steel	Hammered gold and ivory	£4 17 0	£2 2 6
	"Sunray" de-luxe LGH.456T	Portable	28¼ × 14 × 8¼	2 kW	Thermostatic	Sheet steel	Hammered gold and ivory	£10 18 11	£4 16 1
	"Sunray" de-luxe LGH.455T	Portable	28¼ × 19½ × 8¼	2½ kW	Thermostatic	Sheet steel	Hammered gold and ivory	£18 4 11	£8 0 1
HEATOVENT ELECTRIC, LTD., Lomond Street, Glasgow, N.2.	Metal	Portable	16 × 15½ × 5½ to 23 × 24 × 6	1 to 3 kW	Full or half-heat switches or thermostatic	Steel	Brown, gold or bronze	£7 0 0 to £14 0 0	£3 1 7 to £6 3 2
	Console	Portable	23 × 21¾ × 6½	2 kW	Full or half-heat switches or thermostatic	Wood veneer	Mahogany, walnut or oak or bird's eye maple	£12 0 0 (m.w. or o.) £15 0 0 (maple)	£5 5 7 (m.w. or o.) £6 12 0 (maple)
HEATRAE, LTD., Heatrae Works, Norwich.	321	Floor mounting	34½ × 18½ × 6½	1 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£10 2 0	£4 8 8
	322	Floor mounting	34½ × 29 × 6½	2 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£16 5 0	£7 2 8
	323	Floor mounting	34½ × 41 × 6½	3 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£19 19 0	£8 15 1
	2410	Wall mounting	30½ × 14 × 5	1 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£9 10 0	£4 3 5
	2420	Wall mounting	30½ × 26 × 5	2 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£15 8 6	£6 15 4
	2430	Wall mounting	30½ × 38 × 5	3 kW	By arrangement	Steel	Black, grey, brown, beige, silver or bronze	£18 17 0	£8 5 5
H.M.V. HOUSEHOLD APPLIANCES, Hayes, Middx.	"Cavendish" HC.2 and HCS.2	Portable fan heater	11¼ × 13½ × 11	2 kW	Unswitched (HC.2) Half-heat and heat-off switch (HCS.2)	Plastic, metal base	Cream and black, cream and brown or walnut	£8 6 6 (HC.2) £8 15 1 (HCS.2)	£3 13 0 (HC.2) £3 16 11 (HCS.2)
HOBOURN DOMESTIC APPLIANCES, LTD., Strood, Rochester, Kent.	W.H./1, W.H./2 and W.H./3	Wall mounting	18 × 19⅜ × 4⅜	1½ kW	On/off (W.H./1) Unswitched (W.H./2) Thermostat (W.H./3)	Steel	Stoved enamel colours	£5 16 0 (W.H./1) £5 5 0 (W.H./2) £6 10 0 (W.H./3)	£2 11 2 (W.H./1) £2 6 4 (W.H./2) £2 17 4 (W.H./3)
	P.W.H./2	Portable	22½ × 19½ × 5	1½ kW	Unswitched	Steel	Ivory or hammered gold	£6 8 0	£2 16 5



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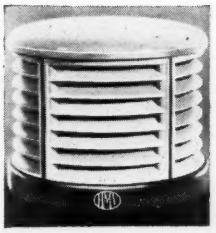

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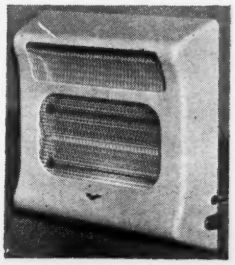

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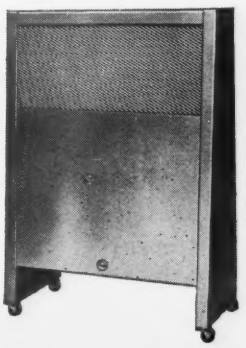
21. *L. G. Hawkins model LGH.454T 2 kW convector*
22. *H.M.V., "Cavendish" room heater*
23. *Hobourn wall mounting model*
24. *Grubb 2 kW castor model*
25. *G.E.C. D.2804 2 kW convector*



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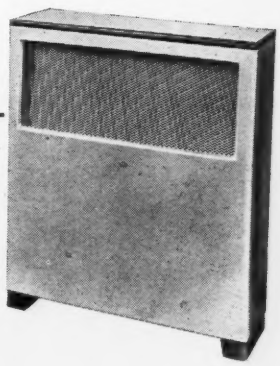

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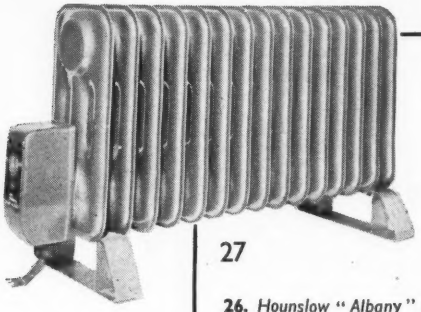

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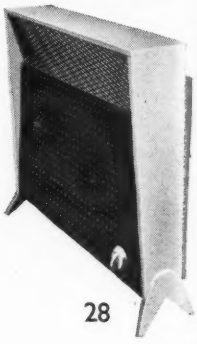

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26. *Hounslow "Albany" portable heater*
27. *Hurseal 3 kW oil-filled radiator*
28. *H.V.E. (Electric) "Bournemouth" convector*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
HOBOURN DOMESTIC APPLIANCES, LTD., Strood, Rochester, Kent. *(continued)*	P.W.H./1 and P.W.H./3	Portable	22½ × 19¼ × 5	2 kW	Half-heat switch (P.W.H./1) Thermostat (P.W.H./3)	Steel	Ivory or hammered gold	£6 18 0 (P.W.H./1) £7 10 0 (P.W.H./3)	£3 0 10 (P.W.H./1) £3 6 2 (P.W.H./3)
	P.N.H./3 and P.C.H./2	Portable safety heater	17 × 19 × 5¼	1,200 W	Safety cut-out	Steel	Pink or blue (P.N.H./3) or mushroom (P.C.H./2)	£6 10 0	£2 17 4
	"Ocean" 1	Oil-filled radiator	24⅜ × 19¾ × 8	720 W	3-heat switch	Steel	Cream stoved enamel	£15 17 0	£6 19 10
	"Ocean" 2	Oil-filled radiator	26 × 26 × 8	1,200 W	3-heat switch	Steel	Cream stoved enamel	£17 5 10	£7 12 6
	"Ocean" 3	Oil-filled radiator	28 × 31⅜ × 8	1½ kW	3-heat switch	Steel	Cream stoved enamel	£20 12 1	£9 1 9
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex.	"Standard" 1 and 1.T.	Portable	27 × 14 × 9½	1 kW	Unswitched (1) Thermostat (1.T.)	Steel	Hammered beige	£6 16 6 (1) £9 7 5 (1.T.)	£3 0 2 (1) £4 2 8 (1.T.)
	"Standard" 2, 2.T. and 2.T.S.	Portable	27 × 16 × 9½	2 kW	Half-heat switch (2) Thermostat (2.T.) Thermostat and switch (2.T.S.)	Steel	Hammered beige	£8 10 8 (2) £10 5 10 (2.T.) £11 3 2 (2.T.S.)	£3 15 3 (2) £4 10 10 (2.T.) £4 18 5 (2.T.S.)
	"Standard" 9, 9.T. and 9.T.S.	Portable	27 × 16 × 9½	3 kW	Half-heat switch (9) Thermostat (9.T.) Thermostat and switch (9.T.S.)	Steel	Hammered beige	£10 2 2 (9) £11 17 4 (9.T.) £12 14 8 (9.T.S.)	£4 9 2 (9) £5 4 8 (9.T.) £5 12 4 (9.T.S.)
	"Superb" 21, 21.T. and 21.T.S.	Portable	30 × 16 × 9½	2 kW	Half-heat switch (21) Thermostat (21.T.) Thermostat and switch (21.T.S.)	Steel	Hammered antique gold, gilt louvres	£9 18 6 (21) £11 13 8 (21.T.) £12 11 0 (21.T.S.)	£4 7 6 (21) £5 3 1 (21.T.) £5 10 8 (21.T.S.)
	"Superb" 22, 22.T. and 22.T.S.	Portable	30 × 16 × 9½	3 kW	Half-heat switch (22) Thermostat (22.T.) Thermostat and switch (22.T.S.)	Steel	Hammered antique gold, gilt louvres	£11 10 0 (22) £13 5 2 (22.T.) £14 2 6 (22.T.S.)	£5 1 5 (22) £5 16 11 (22.T.) £6 4 7 (22.T.S.)
	"De Luxe" 3, 3.T. and 3.T.S.	Portable	27½ × 16½ × 9	2 kW	Half-heat switch (3) Thermostat (3.T.) Thermostat and switch (3.T.S.)	Steel	Hammered beige and black	£11 0 0 (3) £12 15 2 (3.T.) £13 12 6 (3.T.S.)	£4 17 0 (3) £5 12 6 (3.T.) £6 0 2 (3.T.S.)
	"Dual Purpose" 24	Portable radiant/convector	27 × 16 × 9½	1 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£10 10 0	£4 12 7
	"Dual Purpose" 25	Portable radiant/convector	27 × 16 × 9½	2 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£11 3 2	£4 18 5
	"Triangle" 4	Portable (corner fitting)	32 × 21 × 10¾	2 kW	Half-heat switch	Steel	Bronze and black	£9 6 5	£4 2 2
	"Wall Type" 5 and 6	Wall fixing	23½ × 17 × 5¾	1 kW (5) 2 kW (6)	Switch	Steel	Bronze	£5 10 3 (5) £6 18 1 (6)	£2 8 7 (5) £3 0 11 (6)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex. *(continued)*	"Dual Purpose Wall Type" 12	Wall fixing radiant/convector	23½ × 17 × 5¾	1 kW convection and 1 kW radiant	Separate switches	Steel	Bronze	£8 5 5	£3 13 0
	"Dual Purpose Wall Type" 15	Wall fixing radiant/convector	23½ × 17 × 5¾	2 kW convection and 1 kW radiant	Separate switches	Steel	Bronze	£9 16 11	£4 6 10
	"Panel Inset" 7, 8 and 16	Flush wall fitting	19¼ × 21½ × 1⅛	2 kW	Unswitched (8) Thermostat (7) Thermostat and switch (16)	Steel	Figured walnut or hammered beige	£9 8 3 (8) £11 7 7 (7) £14 0 1 (16)	£4 3 0 (8) £5 0 5 (7) £6 3 6 (16)
	"Panel Inset" 26, 27 and 29	Flush wall fitting	19¼ × 21½ × 1⅛	3 kW	Unswitched (29) Thermostat (26) Thermostat and switch (27)	Steel	Figured walnut or hammered beige	£10 19 9 (29) £12 19 1 (26) £15 11 7 (27)	£4 16 11 (29) £5 14 4 (26) £6 17 5 (27)
	"Pixie" 18 and 19	Wall fixing	14½ × 12 × 4½	750 W (18) or 1 kW (19)	Switch	Steel	Hammered beige	£5 10 3 (18) £5 10 3 (19)	£2 8 7 (18) £2 8 7 (19)
	"Standard Offset" 13, 14 and 17	Wall fixing	19¼ × 21½ × 5½	2 kW	Unswitched (14) Thermostat (13) Thermostat and switch (17)	Steel	Figured walnut or hammered beige	£9 8 3 (14) £11 7 7 (13) £14 0 1 (17)	£4 3 0 (14) £5 0 5 (13) £6 3 6 (17)
	"Standard Offset" 32, 33 and 34	Wall fixing	19¼ × 21½ × 5½	3 kW	Unswitched (34) Thermostat (32) Thermostat and switch (33)	Steel	Figured walnut or hammered beige	£10 19 9 (34) £12 19 1 (32) £15 11 7 (33)	£4 16 11 (34) £5 14 4 (32) £6 17 5 (33)
	"Albany" 35 and 35.T.	Portable	21 × 16 × 5¼	1 kW	Unswitched (35) Thermostat (35.T.)	Steel	Hammered beige	£5 5 0 (35) £7 15 11 (35.T.)	£2 6 4 (35) £3 8 10 (35.T.)
	"Albany" 36, 36.T. and 36.T.S.	Portable	21 × 16 × 5¼	2 kW	Half-heat switch (36) Thermostat (36.T.) Thermostat and switch (36.T.S.)	Steel	Hammered beige	£6 17 7 (36) £8 12 9 (36.T.) £9 10 1 (36.T.S.)	£3 0 8 (36) £3 16 3 (36.T.) £4 3 9 (36.T.S.)
	"Albany" Dual Purpose 37	Portable radiant/convector	21 × 16 × 5¼	1 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£7 17 6	£3 9 6
HURSEAL, LTD., 229, Regent Street, London, W.1.	HM½ HM¾	Oil-filled panel portable	20 × 29 × 3 20 × 41 × 3	½ kW ¾ kW	Built in thermostatic	Steel	Standard: bronze or cream stoved enamel. Eau-de-nil, sky blue, white, gold, etc., also available.	£9 0 6 £11 2 4	£3 19 2 £4 17 7
	TV½ TV¾ TV1 TV1½	Oil-filled panel portable	26 × 29 × 3 26 × 29 × 3 26 × 41 × 3 26 × 52 × 3	½ kW ¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£10 8 6 £11 2 4 £13 4 0 £15 19 6	£4 11 5 £4 17 7 £5 15 10 £7 0 2
	HJ	Oil-filled 2-column portable	17 × 27 × 3¾	¾ kW	Built in thermostatic	Steel		£12 10 0	£5 9 9
	TV3	Oil-filled 3-column portable	28 × 17 × 5¼	1 kW	Built in thermostatic	Steel		£15 5 6	£6 14 0
	J.05 J.75 J.10 J.15	Oil-filled 2-column portable, floor or wall fitting	17 × 20 × 3¾ 17 × 27 × 3¾ 17 × 38 × 3¾ 17 × 53 × 3¾	½ kW ¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£10 8 6 £12 10 0 £15 19 6 £20 16 6	£4 11 5 £5 9 9 £7 0 2 £9 2 9
	S.75 S.10 S.15	Oil-filled 3-column portable, floor or wall fitting	13⅜ × 22 × 5½ 13⅜ × 29 × 5½ 13⅜ × 42 × 5½	¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£12 10 0 £15 19 6 £20 16 6	£5 9 9 £7 0 2 £9 2 9
	F.11 F.12 F.13 F.14 F.15 F.16 F.17 F.18 F.19 F.20	Oil-filled 3-column, floor or wall fitting	21 × 14 × 5½ 21 × 22 × 5½ 24 × 20 × 5½ 28 × 17 × 5½ 21 × 31 × 5½ 24 × 28 × 5½ 28 × 25 × 5½ 21 × 41 × 5½ 24 × 36 × 5½ 28 × 31 × 5½	½ kW 1 kW 1 kW 1 kW 1½ kW 1½ kW 1½ kW 2 kW 2 kW 2 kW	Built in thermostatic	Steel		£10 8 6 £15 19 6 £15 19 6 £15 5 6 £20 16 6 £20 16 6 £20 16 6 £26 8 0 £26 8 0 £26 8 0	£4 11 5 £7 0 2 £7 0 2 £6 14 0 £9 2 9 £9 2 9 £9 2 9 £11 11 8 £11 11 8 £11 11 8
	P.1 P.2 P.3 P.4 P.5	Oil-filled panel, floor or wall fitting	18 × 29 × 3 24 × 24 × 3 18 × 52 × 3 24 × 41 × 3 30 × 36 × 3	½ kW ½ kW 1 kW 1 kW 1 kW	Built in thermostatic	Steel		£9 14 6 £9 14 6 £14 11 6 £14 11 6 £14 11 6	£4 5 4 £4 5 4 £6 7 10 £6 7 10 £6 7 10
	P.6 P.7 P.8 P.9 P.10	Oil-filled panel, floor or wall fitting	18 × 78 × 3 24 × 59 × 3 30 × 50 × 3 30 × 69 × 3 24 × 78 × 3	1½ kW 1½ kW 1½ kW 2 kW 2 kW	Built in thermostatic	Steel		£18 15 0 £18 15 0 £18 15 0 £22 18 6 £22 18 6	£8 4 7 £8 4 7 £8 4 7 £10 1 1 £10 1 1

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
H.V.E. (ELECTRIC), LTD., Viaduct Works, Kirkstall Road, Leeds, 4.	"Bournemouth" DC.1.P and DC.1.V	Portable	23×24×6½	1 kW	—	Wood with steel case	Pastel colours or veneer	£8 8 0 (DC.1.P) £10 10 0 (DC.1.V)	£3 15 6 (DC.1.P) £4 14 6 (DC.1.V)
	"Bournemouth" DC.2.P and DC.2.V	Portable	23×24×6½	2 kW	—	Wood with steel case	Pastel colours or veneer	£9 9 0 (DC.2.P) £11 11 0 (DC.2.V)	£4 5 0 (DC.2.P) £5 4 0 (DC.2.V)
	"Bournemouth" DCR.2.P and DCR.2.V	Portable	23×24×6½	2 kW	Energy regulator	Wood with steel case	Pastel colours or veneer	£10 10 0 (DCR.2.P) £12 12 0 (DCR.2.V)	£4 14 6 (DCR.2.P) £5 13 6 (DCR.2.V)
	"Bournemouth" DC.3.P and DC.3.V	Portable	23×24×6½	3 kW	—	Wood with steel case	Pastel colours or veneer	£11 17 6 (DC.3.P) £14 0 0 (DC.3.V)	£5 6 10 (DC.3.P) £6 6 0 (DC.3.V)
	"Bournemouth" DCR.3.P and DCR.3.V	Portable	23×24×6½	3 kW	Energy regulator	Wood with steel case	Pastel colours or veneer	£12 17 6 (DCR.3.P) £15 0 0 (DCR.3.V)	£5 16 0 (DCR.3.P) £6 15 0 (DCR.3.V)
JACKSON ELECTRIC STOVE CO., LTD., Dallow Road, Luton.	"Masterpiece" 785	Portable	23 7/16 × 23 7/16 × 7	2 kW	Thermostatic	Steel and aluminium	Anodised gold, pale green, pale blue, peach or red aluminium frame and centre panel	£10 10 0	£4 12 2
	"Masterpiece" 786	Portable	23 7/16 × 23 7/16 × 7	2 kW	Switch	Steel and aluminium	Gold anodised aluminium frame and centre panel	£9 10 0	£4 3 4
	"Masterpiece" 787	Portable	23 7/16 × 20 7/16 × 7	1 kW	Thermostatic	Steel and aluminium	Gold anodised aluminium frame and centre panel; or cream or primer centre panel	£9 10 0	£4 3 4
	"Masterpiece" 788	Portable	23 7/16 × 20 7/16 × 7	1 kW	Switch	Steel and aluminium	Gold anodised aluminium frame and centre panel; or cream or primer centre panel	£8 10 0	£3 14 7
M. & J. LOSSOS & CO., LTD., 29-31, Beethoven Street, London, W.10.	"Kaloric Mayfair"	Cabinet	19⅞ × 12½ × 6¼	750 W	Thermostat extra	Steel	Bronze or cream	£6 15 0 (bronze) £7 10 0 (cream)	£2 19 4 (bronze) £3 5 10 (cream)
	"Kaloric Mayfair"	Cabinet	19⅞ × 12½ × 6¼	1 kW	Thermostat extra	Steel	Bronze or cream	£6 15 0 (bronze) £7 10 0 (cream)	£2 19 4 (bronze) £3 5 10 (cream)
	"Kaloric Mayfair"	Cabinet	25⅜ × 22 × 7	2 kW	Switch, thermostat extra	Steel	Bronze or cream	£10 10 0 (bronze) £11 10 0 (cream)	£4 12 2 (bronze) £5 0 11 (cream)
	"Kaloric Mayfair"	Cabinet	25⅜ × 22 × 7	3 kW	Switches, thermostat extra	Steel	Bronze or cream	£12 0 0 (bronze) £13 0 0 (cream)	£5 5 5 (bronze) £5 14 0 (cream)
	"Kaloric Populair"	Portable	20⅛ × 18 × 3	1 kW	—	Steel	Bronze (A) or cream or light grey (B)	£5 10 0 (A) £6 0 0 (B)	£2 8 4 (A) £2 12 6 (B)
MACKEY BOWLEY (STEELWORKERS), LTD., 21, Caledonian Road, London, N.1.	"Maybow" R.1	Portable or wall mounting	28×21×2½	¾ kW	Thermostatic	Tubular steel	Old gold stoved enamel	£11 1 0	£4 14 6
	"Maybow" R.2	Portable or wall mounting	28×25×2½ —	1 kW	Thermostatic	Tubular steel	Old gold stoved enamel	£12 17 9	£5 10 3
	"Maybow" R.3	Portable or wall mounting	28×33×2½	1½ kW	Thermostatic	Tubular steel	Old gold stoved enamel	£16 0 0	£6 16 10
	"Maybow" Bathroom	Wall mounting	27×23×2½	350 W	—	Tubular steel	White stoved enamel	£8 16 1	£3 15 4
MIDLAND ELECTRIC MFG. CO., LTD., Tyseley, Birmingham, 11.	"Memvair"	Portable	24×22×6½	1 kW	Thermostat if required	Steel	Bronze	£7 14 0 £9 8 0 (with thermostat)	£3 7 7 £4 2 6 (with thermostat)
	"Memvair"	Portable	24×22×6½	1½ kW	Switch or thermostat	Steel	Bronze	£8 16 0 £9 15 0 (with thermostat)	£3 17 3 £4 5 7 (with thermostat)
	"Memvair"	Portable	24×32×6½	2 kW	Switch or thermostat	Steel	Bronze	£12 10 0 £13 10 0 (with thermostat)	£5 9 8 £5 18 6 (with thermostat)
	"Circulair"	Portable	22½ × 7½ × 7½	1 kW	—	Steel	Bronze	£3 15 0	£1 12 11
	"Rotovair"	Portable	15½ × 12¾ × 9¾	2 kW	Switch	Wood	Walnut or mahogany	£8 15 0	£3 16 9

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
MORPHY-RICHARDS, LTD., 6, Conduit Street, London, W.1.	RP/10	Portable	17⅛ × 18 × 6	1 kW	—	Steel	Warm bronze	£3 15 0	£1 12 6
	QU/10	Portable	27 × 17 × 9	1 kW	—	Steel	Warm bronze	£5 5 0	£2 5 6
	QS/20 and QT/20	Portable	27 × 21 × 9	2 kW	Half-heat switch (QS/20) Thermostatic (QT/20)	Steel	Warm bronze	£6 10 0 (QS/20) £7 5 0 (QT/20)	£2 16 4 (QS/20) £3 2 10 (QT/20)
	QR/20	Portable	27 × 17 × 9	1 kW (convector) 1 kW (radiant)	Switch for fire	Steel	Warm bronze	£7 0 0	£3 0 8
	QR/30	Portable	27 × 21 × 9	2 kW (convector) 1 kW (radiant)	Switch (fire) thermostatic (convector)	Steel	Warm bronze	£8 15 0	£3 15 10
	QBA/10	Portable	24 × 16 × 5½	1 kW	Thermostatic	Steel	Warm bronze	£5 18 6	£2 11 4
	QBA/20	Portable	24 × 32 × 5½	2 kW	Thermostatic	Steel	Warm bronze	£8 12 6	£3 14 9
PANELEC (GT. BRITAIN), LTD., 21, Bloomsbury Street, London, W.C.1.	"Panelec"	Surface, wall panel	78¾ × 39½ × 1⅛ and 105⅛ × 28½ × 1⅛	750 W	Room thermostat	Steel	Primer	£19 10 0	£11 14 0
	"Panelec"	Surface, wall panel	38½ × 34 × 1⅛ (a) 36 × 64 × 1⅛ (b) 78⅛ × 39½ × 1⅛ (c) 54 × 83 × 1⅛ (d)	380 W (a) 550 W (b) 750 W (c) 1090 W (d)	Room thermostat	Aluminium	Aluminium	£11 10 0 (a) £17 10 0 (b) £23 10 0 (c) £31 0 0 (d)	£6 18 0 £10 10 0 £14 2 0 £18 12 0
H. G. POXON ENGINEERING, LTD., 1-5, Northolt Road, Harrow, Middx.	1622/2H	Wall mounting panel	24½ × 34 × 1½	700 W	Separate thermostat	Plastics panel	To requirements on site	£5 4 0	£2 5 6
	1622/3H	Wall mounting panel	24½ × 50½ × 1½	1 kW	Separate thermostat	Plastics panel	To requirements on site	£7 14 0	£3 7 4
	1622/6H	Wall mounting panel	24½ × 100 × 1½	2 kW	Separate thermostat	Plastics panel	To requirements on site	£15 4 0	£6 12 10
	1622/2C	Ceiling mounting panel	23½ × 34 (ceiling area)	500 W	Separate thermostat	Plastics panel	To requirements on site	£5 12 0	£2 9 0
	1622/3C	Ceiling mounting panel	23½ × 50½ (ceiling area)	750 W	Separate thermostat	Plastics panel	To requirements on site	£8 6 0	£3 12 8
	1622/4C	Ceiling mounting panel	23½ × 67 (ceiling area)	1 kW	Separate thermostat	Plastics panel	To requirements on site	£11 0 0	£4 16 4

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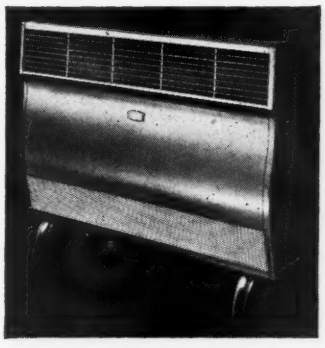
29. *M.E.M. "Circulair" portable heater*
30. *Morphy-Richards QBA/20 convector*
31. *Lossos "Kaloric Popular" panel convector*
32. *MacKey Bowley model R2 oil-filled heater*
33. *Jackson "Masterpiece" 2 kW convector*



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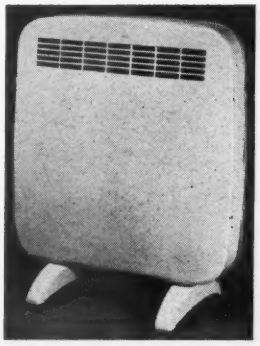

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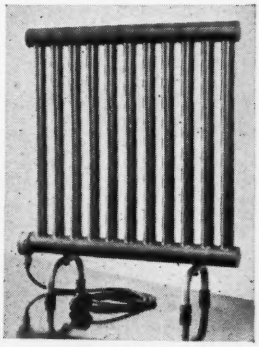

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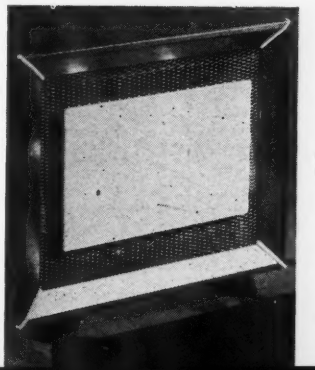

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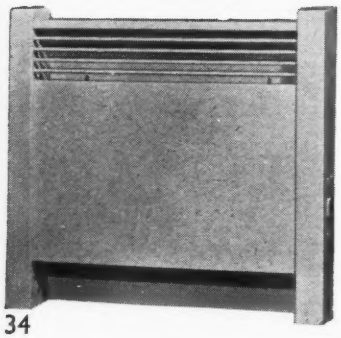

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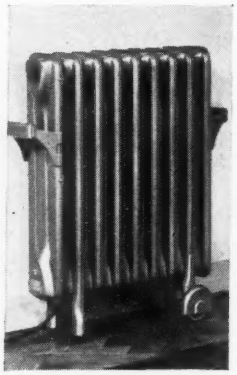

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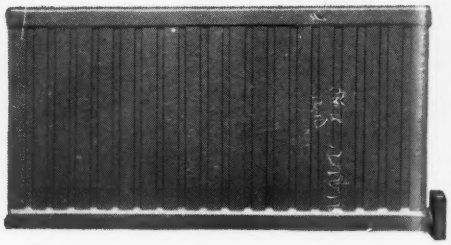

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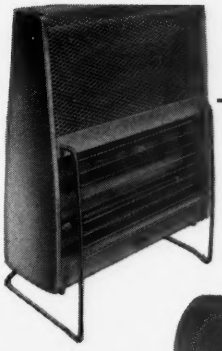
34. *Unity Heating "Conp" convector*
35. *Santon fluid-filled radiator*
36. *Welmec A.E.G. "Airotherm" portable convector*
37. *Steel Radiators oil-filled panel heater*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
REEVES ELECTRICAL & RADIO CO., LTD., Reelek Works, Baldock, Herts.	"Reelek"	Portable	18×14×9½	1 kW	Thermostatic	Steel	Mottled fawn, aluminium grille	£4 0 0	£1 15 0
	"Reelek"	Portable	21½×20×9½	2 kW	Thermostatic	Steel	Mottled fawn, aluminium grille	£5 11 0	£2 8 8
REMPLOY, LTD., 25-28, Buckingham Gate, London, S.W.1.	"Chill-chaser"	Oil-filled radiator	22×25¼×7	500 W	Thermostat	Steel	Walterised and stoved enamel	£9 5 0	£4 1 2
	"Chill-chaser"	Oil-filled radiator	30×33½×7	750 W	Thermostat	Steel	Walterised and stoved enamel	£11 5 0	£4 18 8
	"Chill-chaser"	Oil-filled radiator	38×41¼×7	1 kW	Thermostat	Steel	Walterised and stoved enamel	£12 17 6	£5 13 0
REVO ELECTRIC CO., LTD., Tipton, Staffs.	F14980	Portable	22½×15½×10½	1 kW	Unswitched	Steel	Welsh grey, pale gold or Cotswold stone	£5 5 0	£2 6 1
	F14984 and F14985	Portable	22½×19½×10½	2 kW	Half-heat switch (F14984) or thermostat (F14985)	Steel	Welsh grey, pale gold or Cotswold stone	£6 10 0 (F14984) £7 5 0 (F14985)	£2 17 0 (F14984) £3 3 8 (F14985)
	F14982 and F14983	Portable	22½×15½×10½	1 kW (convector) and 1 kW (radiant)	Switch (radiant) (F14982) Switch (radiant) and thermostat (convector) (F14983)	Steel	Welsh grey, pale gold or Cotswold stone	£7 17 6 (F14982) £8 12 6 (F14983)	£3 9 1 (F14982) £3 15 8 (F14983)
	F14986 and F14987	Portable	22½×19½×10½	2 kW (convector) and 1 kW (radiant)	Switch (radiant) (F14986) Switch (radiant) and thermostat (convector) (F14987)	Steel	Welsh grey, pale gold or Cotswold stone	£8 18 6 (F14986) £9 13 6 (F14987)	£3 18 4 (F14986) £4 4 11 (F14987)
SANTON, LTD., Somerton Works, Newport, Mon.	Santon	Fluid-filled column radiator	24⅝×18×6	1 kW	Thermostatic	Steel	Stone	£14 0 0	£6 3 3
	Santon	Fluid-filled column radiator	24⅝×28×6	1½ kW	Thermostatic	Steel	Stone	£18 5 0	£8 0 6
	Santon	Fluid-filled column radiator	24⅝×36×6	2 kW	Thermostatic	Steel	Stone	£23 0 0	£10 2 5
SIMPLEX ELECTRIC CO., LTD., Creda Works, Blythe Bridge, Staffs.	"California"	Portable	23⅛×30×6¾	1½ kW	—	Steel	Six stove enamelled colours	£10 19 0	£4 16 0
	"Capri"	Portable	22½×25¾×5¼	1 kW	—	Steel	Six two-tone stove enamelled colours	£6 17 3	£3 0 3

38. *Reeves 2 kW "Reelek" convector*
39. *Revo F.14986 radiant convector*
40. *Sutcliffe & Clarkson type HC5/T convector*
41. *Simplex "Creda Capri" room heater*
42. *Remploy "Chillchaser" oil-filled radiator*



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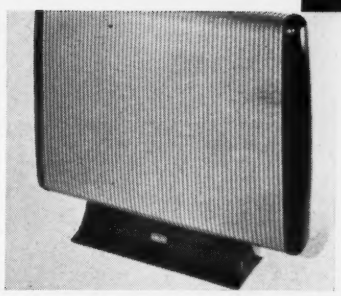

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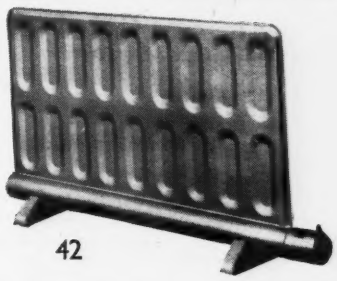

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Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
STEEL RADIATORS LTD., Bridge Road Southall, Middlesex.	500 W.24	Wall mounting	25½×23½×1⅛ 21×27×1⅛	500 W	Thermostatic	Steel	Gold or cream	£9 10 0	£4 3 3
	1000 E.C.	Feet or castors	24×31×3 28¾×24×3	1 kW	Thermostatic	Steel	Gold or cream	£13 10 0	£5 18 6
	1500 W.30	Wall mounting	31½×52×1⅛ 44½×33×1⅛	1½ kW	Thermostatic	Steel	Gold or cream	£17 10 0	£7 13 3
	2000 C.24	Feet or castors	24×38×5 34×24×5	2 kW	Thermostatic	Steel	Gold or cream	£21 10 0	£9 8 9
SUTCLIFFE & CLARKSON, LTD., Spa Street Works, Burnley, Lancs.	HCR/4	Portable	20×13×9½	1 kW (convection) 1 kW (radiant)	Radiant heat switched	Sheet steel	Hammered bronze	£5 9 4	£2 9 2
	HC5/S	Portable	24½×20×5½	2 kW	3-heat switch	Sheet steel	Hammered bronze	£6 4 0	£2 15 10
	HC5/T	Portable	24½×20×5½	2 kW	Thermostatic	Sheet steel	Hammered bronze	£6 15 8	£3 1 1
UNITY HEATING, LTD., Chilworth Manor, Southampton.	"Conp" 1911 and 1921	Portable	24×27×5	1 kW	Thermostatic (1911) Unswitched (1921)	Steel	Bronze or grey	£12 5 0 (1911) £11 0 0 (1921)	£5 7 6 (1911) £4 16 6 (1921)
	"Conp" 1912 and 1922	Portable	24×27×5	2 kW	Thermostatic and 2-heat switch (1912) 2-heat switch (1922)	Steel	Bronze or grey	£13 0 0 (1912) £11 15 0 (1922)	£5 14 1 (1912) £5 3 1 (1922)
	"Conp" 1913 and 1923	Portable	28×30×5	3 kW	Thermostatic and 2-heat switch (1913) 2-heat switch (1923)	Steel	Bronze or grey	£14 5 0 (1913) £13 0 0 (1923)	£6 5 1 (1913) £5 14 1 (1923)
	"Wode" 1933	Portable	23×29×6	1½ kW	Thermostatic	Wood	Mahogany and light oak	£15 0 0	£6 11 8
	1951, 1952 and 1953	Inset wall panel	23⅜×24½ (panel) 20⅜×19½×5 (recess)	1, 2 & 3 kW	Separate thermostat	Steel	Bronze or grey	£14 10 0 (1 kW) £15 5 0 (2 kW) £16 10 0 (3 kW)	£6 7 3 (1 kW) £6 13 10 (2 kW) £7 4 9 (3 kW)
	1812, 1813, 1823, 1824 and 1836	Wall mounting panels	12×24×1½ to 30×66×1½	100 W to 1 kW	Separate thermostat	Steel	French grey	£7 10 0 to £26 0 0	£3 5 10 to £11 8 2
	1863 to 1866 and 1893 to 1896	Skirting board panels	6×36×1½ to 6×72×1½ and 9×36×1½ to 9×72×1½	60 W per foot run	Separate thermostat	Steel	French grey	£6 15 0 to £11 5 0	£2 19 3 to £4 18 9
WELMEC CORPORATION, LTD., 147, Strand, London, W.C.2.	AEG "Airotherm"	Portable	21×24×7½	2 kW	Step switches	Vitreous enamelled steel, plastic handles	Brown or green	£9 15 0	£4 7 9

Financial Section

STOCKS and SHARES

THE General Electric Company's decision to lower the rate of the final dividend for 1956-57 from 9½ to 8 per cent was unexpected in the electrical market, although it is payable this time on ordinary capital increased by last autumn's issue of about 4¼ million new shares. No forecast of dividend prospects had been made at the time of that event, when references were made to the persistently rising trend of costs. The interim dividend, also payable on the larger capital, had been maintained at the previous year's rate of 4½ per cent. Initial market reactions to the announcement caused a drop of about 5s in the price of the £1 shares to 50s, which is a shilling or so above this year's low point, and some 8s 9d below the recent best.

Yield of 5 per cent

On the total dividend of 12¼ per cent for the year ended in March, the yield on G.E.C. shares is now approximately on the 5 per cent mark. From the preliminary statement of the results, the amount of the distribution is calculated to be covered about 1¾ times over by the net profit of £2,397,000 (after tax), which compares with the previous surplus of £2,759,000. Apparently the experience of 1955-56 has been repeated, for although sales continued to expand (by 10 per cent in the latest period) the rise in costs continued its process of erosion upon the margin of profit, and is stated to be persisting into the current year. In considering the reduction in profits, the market takes into account the probability that full benefits have yet to be received from the employment of the £14¼ million new money produced by last year's issues of new ordinary shares and loan stock.

Free of Stamp

As a result of new issue activity in the past month or so, the shares of several companies in the electrical and associated industries can at present be bought in the form of renouncement allotment letters and free, consequently, from the 2 per cent transfer stamp duty normally payable by the purchaser. They include the new John Thompson 5s shares, which will be available in that form until 8th August, and stand at 34s to yield 3·7 per cent on the basis of the last dividend. Laurence Scott & Electromotors 5s new "A" shares can be bought at 18s, free of stamp until 12th August, and offer a return of a fraction under 4¼ per cent. Anglo-Portuguese Telephone £1 shares are at present 10s paid, with a further 10s due by 2nd August, until when transfer stamp duty is not payable: the yield at the all-in price of 25s is close on 6½ per cent.

Ward and Goldstone

In raising the dividend from a total of 35 to 40 per cent, Ward & Goldstone are carrying on a record which has made the shares one of the most successful investments in the electrical market since the war. Over six years the trading profit has expanded from under half a million to above the million mark,

Price Changes in

Company or Board	Nom. Value	Middle price 22nd July	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield %	1957 Highest	1957 Lowest
Gilt-edged Stocks						£ s d		
Brit. Elec. 1968/73	100	72½	+1	3	3	4 2 9	80	71½
Brit. Elec. 1974/77	100	70½	+1	3	3	4 5 0	78½	69½
Brit. Elec. 1976/79	100	73½		3½	3½	4 15 3	81½	73½
Brit. Elec. 1974/79	100	84½	+1	4½	4½	5 0 7	92½	83½
Overseas Electric Supply								
Calcutta Elec.	£1	15/-		6†	6†	8 0 0†	19/-	15/-
East African Power	£1	20/-	+1/-	7	7	7 0 0	21/-	19/-
Nigerian Elec.	£1	17/6		10	10*	11 8 6	18/6	17/3
Perak Hydro-Elec.	£1	17/6		10	10*	11 8 6	18/-	13/3
Electrical Shares								
Aberdare Cables	5/-	12/6		17½	17½	7 0 0	12/6	9/9
Aerialite	1/-	6/6	+9d	45	48	7 7 6	6/6	4/9
Allen, W. H.	£1	47/-		10	10	4 5 0	47/3	33/6
Anglo-Portuguese Tel.	£1	24/9		8	8	6 9 3	27/6	20/6
Aron Elec. Ord.	£1	58/9		15	15	5 2 3	60/-	53/6
Assd. Automation	10/-	23/9		5	7½	3 3 3	24/9	17/9
Assoc. Elec. Ord.	£1	61/3	−1/3	15	15	4 18 0	73/-	61/3
Automatic Tel. & El.	£1	75/-		15	17	4 10 9	75/-	54/6
Babcock & Wilcox	£1	72/-	+2/-	15	15	4 3 3	82/6	70/-
Bakelite	10/-	23/9		16	15	6 6 3	24/6	20/9
Baldwin, H. J.	2/-	4/-	+3d	20	20	10 0 0	5/-	3/10½
Berry's Electric	5/-	6/-		—	10	8 6 9	6/3	5/6
British Aluminium	£1	63/9	−1/3	12	12	3 15 3	71/3	63/9
Brit. Elec. Traction: Def. Ord. "A"	5/-	24/-		22½	25	5 4 3	24/6	17/-
B.I. Callender's	£1	50/-		12½	12½	5 0 0	55/-	48/3
B.I. Callender's 6% Pref.	£1	19/6		6	6	6 3 0	21/9	19/6
British Tabulating	£1	55/-		9	9	3 5 6	56/3	42/-
British Thermostat	5/-	25/-		25	25	5 0 0	27/6	25/-
British Vac. Cleaner	5/-	6/-		15	10	8 6 9	8/-	6/-
Brook Motors	10/-	37/6		25	25	6 13 3	37/6	30/-
Brush Group	5/-	7/9		10	Nil	—	8/-	4/6
Bulgin, A. F.	1/-	4/6	−3d	50	40*	8 17 9	5/6	4/6
Burco Dean	5/-	13/9	−3d	22½	20	7 5 6	14/-	8/9
Cable & Wireless: Ord.	5/-	12/3	−3d	10	10	4 1 9	12/6	9/6
4% Loan	100	90½		4	4	4 8 6	92½	89
Chloride El. Storage "A"	£1	66/3	−6d	17½	17½	5 5 9	68/9	58/-
Clarke Chapman	£1	172/6	−2/6	22½	27½	3 3 9	9	6½
Cole, E. K.	5/-	20/9	−3d	17½	17½	4 4 3	23/6	16/6
Cossor, A. C.	5/-	5/9		15	Nil	Nil	7/3	5/9
Crabtree	10/-	25/6		20	20	7 17 0	26/-	23/3
Crompton Parkinson Ord.	5/-	17/6		16	16	4 11 3	17/9	14/6
De La Rue	5/-	22/9	+6d	30	35	7 13 9	24/6	16/3
Decca "A"	4/-	29/6	+1/3	43¾	43¾	5 18 9	32/3	26/10½
Desoutter	5/-	35/6		30	32½	4 11 6	35/6	27/6
Dewhurst	2/-	7/6		30	16½*	4 6 9	7/6	5/9
Dictograph Tel.	2/-	5/9		20	20	—	6/3	5/9
Dubilier Condenser	1/-	7/-	−6d	30	30	4 5 9	7/6	5/6
Duport	5/-	19/-		23	25	6 11 6	19/6	17/6
E.M.I.	10/-	34/6	+1/9	15	15	4 7 0	34/9	23/9
Electrical Components	5/-	7/6		25	12½*	8 6 9	7/6	6/6
Elec. Construction	£1	26/3		8½	8½	6 9 6	27/6	21/9
Elliott Bros.	5/-	31/6		17½	20	3 3 6	33/6	26/3
Enfield Cable Ord.	£1	18/-	+4/-	Nil	Nil	Nil	21/6	13/-
English Electric	£1	62/6	−1/3	12½	14	4 9 6	65/-	47/6
English Electric 3¾% Pref.	£1	12/-		3¾	3¾	6 5 0	14/3	13/-
Ericsson Tel.	5/-	50/-	+6d	20†	22†	2 4 0†	50/-	33/3
Ever Ready	5/-	18/9	−6d	35	37½	5 0 0*	20/-	15/-
Falk Stadelmann	£1	39/6		17½	17½	8 17 3	40/6	35/-

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.
* After scrip issue. † Free of income tax. ‡ Dividend indicated.

and the amount of the dividend has been raised in each successive year without any departure from a strictly conservative financial policy: the latest rate of dividend still apparently leaves more than four-fifths of the profit for retention in the business, and reserves have again been built up to the point at which the proposed distribution of another 100 per cent scrip issue (there was a similar operation in 1954) can be very easily accommodated. At 55s 9d the price of the £1 shares stands some 18s above the level at which it began this year.

Electrical Investments

Company or Board	Nom. Value	Middle price 22nd July	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield % £ s d	1957 Highest	1957 Lowest
Electrical Shares—continued								
G E.C. Ord.	£1	50/-	−5/-	14	12½	5 0 0	58/9	48/9
G.E.C. 6½ Pref.	£1	20/6		6½	6½	6 6 9	23/6	20/6
General Cables	5/-	15/6	+1/3	30	30	9 13 6	15/6	11/6
Greenwood & Batley	£1	47/6		17½	17½	7 7 3	47/6	45/3
Hackbridge Holdings	5/-	19/3		25	30	7 15 9	21/9	18/9
Hackbridge & Hewittic	5/-	15/-		23	20	6 13 6	16/-	13/6
Head Wrightson	£1	143/9		20	22½	3 2 6	146/3	112/6
Heatrae	2/-	4/9		15	15	6 6 6	4/9	4/-
Henley's	10/-	15/-		11½	11½	7 13 3	17/-	15/-
Holophane	5/-	25/-		30	30	6 0 0	26/3	17/-
Hoover	5/-	40/-		50	50	6 5 0	44/-	24/9
I.C.I.	£1	45/-		10	10	4 9 0	46/6	37/9
Intl. Combustion	5/-	27/3		20	22½	4 2 6	30/-	20/-
Johnson & Phillips	£1	27/6	−6d	15	10	7 5 6	34/6	27/6
Lancashire Dynamo	£1	42/6		11	11	5 3 6	45/-	36/9
Laurence, Scott	5/-	17/3	−6d	15	15	4 7 0	19/9	13/9
Lister, R. A.	£1	32/-	−3d	10	10	6 5 0	33/9	26/9
London Elec. Wire	£1	48/-	+6d	12½	12½	5 4 3	53/9	43/-
Lucas, J.	£1	33/9	−1/3	7½	7½	4 9 0	36/6	30/6
Marconi Marine	£1	37/-	+2/-	10	10	5 8 0	37/-	31/-
Marryat & Scott	2/-	12/6x.d.		30	35	5 12 0	13/-	8/-
Mather & Platt	£1	58/9	−2/6	15	15	5 2 3	63/9	51/3
Metal Industries	£1	28/- x.d.		Nil	9	6 8 6	30/-	20/3
Midland Elec. Mfg.	£1	48/9		12½	12½	5 2 6	48/9	45/-
Morphy-Richards	4/-	20/-	+1/-	50	50	4 0 0*	20/-	11/9
Murex	£1	71/9	−6/6	20	20	5 11 6	79/6	65/-
Newman Ind.	2/-	2/9		10	10	7 5 6	2/9	2/1
Oldham & Son	1/-	2/9	+3d	17½	17½	6 7 3	2/9	2/3
Parnall (Yate)	5/-	7/3		12	12	8 5 6	8/9	5/9
Parsons, C. A.	£1	66/3		10	8½*	—	71/3	50/6
Plessey	10/-	80/-	−4/6	27½	30	3 15 0	86/3	61/-
Pye "A" Deferred	5/-	18/9		12½	12½	3 6 6	20/-	15/9
Reyrolle	£1	101/3		16½	17½	3 9 3	110/-	90/-
Rheostatic	4/-	9/-		18½	12½*	5 11 0	10/-	8/9
Richardsons Westgarth	5/-	18/6		16½	16½	4 10 0	20/-	17/-
Scottish Cables	4/-	18/3	+6d	27½	27½	6 0 6	19/3	15/-
Simon-Carves	5/-	36/3		28½	20*	2 15 3	36/3	26/-
Smith (England), S.	4/-	15/-		17½	17½	4 13 3	15/9	13/-
Southern Areas	£1	15/6	+6d	7½	7½	9 13 6	20/-	13/9
Strand Elec.	5/-	7/3		15	15	10 6 9	8/-	7/3
Sturtevant	5/-	23/-	−6d	15†	15†	3 5 3†	27/-	22/9
Sun Elec.	£1	43/9		20	25	11 8 6	43/9	43/9
Switchgear & Cowans	5/-	13/9		25	25	9 1 9	15/6	13/6
Taylor Tunnicliff	5/-	12/9		15	15	5 17 9	13/9	11/9
T.C.C.	10/-	40/-		25	25	6 5 0	40/-	35/-
T.C. & M.	£1	25/-		8½	8½	6 16 0	31/-	24/6
Telephone Mfg.	5/-	6/-		10	10	8 6 9	8/-	5/9
Telephone Rentals	5/-	12/-		12½	12½	5 4 3	12/6	10/3
Thompson (John)	5/-	33/-	−9d	25	25	3 15 9	37/-	29/3
Thorn Elec.	5/-	25/-	−6d	15	15	3 0 0	26/3	16/3
Thornycroft	£1	28/9		15	12½	8 14 0	37/6	28/9
Tube Investments	£1	66/6	−1/-	22½	15*‡	4 10 3	68/9	58/3
Vactric	5/-	20/9	+2/-	17½	25	6 0 6	23/9	12/9
Veritys	5/-	8/6		12½	12½	7 7 0	9/3	8/3
Walsall Conduits	4/-	13/9	−6d	20	20	5 16 3	15/-	11/-
Ward & Goldstone	5/-	55/9	−6d	35	40	3 11 9	56/3	36/9
Watford	2/-	6/6		25	25	7 13 9	6/9	6/3
Westinghouse	£1	37/6	−1/3	18	9‡	4 16 0	41/3	36/-
West, Allen	5/-	12/6	+3d	15	15	—	13/6	9/6
Wolf Electric	5/-	11/-	−6d	20	20	4 10 9*	13/6	8/9

Dubilier Results

Dubilier Condenser 1s shares were quoted at about 7s after the publication of the 1956-57 results. The dividend, which comes as a single annual payment, is being maintained at the rate of 30 per cent to which it was raised last year. At that time the annual report contained references to the prospect of narrower margins, and the net profit now declared comes out about 17 per cent lower at £158,000 (after tax of an almost equal amount). This still appears to give fully fourfold earnings cover for the distribution, and the consequent additions to reserves will raise these to a figure well above the issued ordinary capital of £216,000. The yield on the shares works out at a fraction over 4 per cent.

Price Changes

On the announcement of the terms for the proposed merger between Elliott Brothers and Associated Automation, the 5s shares of the former company were at first marked down a little in the market to 30s (the official quotation remained at 31s 6d), while the latter's were steady at 23s 9d. Shares of the big electrical groups have been subdued by the G.E.C. results. English Electrics and A.E.I. both shed 1s 3d. Enfield Cables jumped 4s to 18s through the revival of the "bid" rumours which enlivened the market earlier this year. Vactric rose 2s to 20s 9d, while Morphy-Richards and Aerialite moved up to their best prices of the year. On the other hand small declines were fairly numerous, and Murex were marked down 6s 6d to 71s 9d after news of the fall in profits: the decline is ascribed largely to stock losses, and the dividend is being maintained at 20 per cent. British Electricity stocks took part in a marked turn for the better in the gilt-edged market.

Dividends Declared

An interim dividend of 5 per cent declared by R. B. Pullin is at the same rate as before, and applies to ordinary capital increased to £377,500 as a result of the "rights" offer, earlier this year, and of the issue of shares in consideration for an acquisition. At 7s 3d the 2s shares show a yield of 5½ per cent on the basis of last year's total of 20 per cent. Parmiter Hope & Sugden 1s shares were quoted at a little over 3s after the declaration of a final dividend making the total 30 per cent for the fourth year in succession, and of a profit of £36,000 (after tax) for the year ended last March. At their present price the shares are on a yield basis of about 9½ per cent. Electrical Components, with profits maintained at about the previous level, are paying in effect the same dividend as for last year allowing for the intervening share-for-share scrip distribution.

REPORTS and DIVIDENDS

The General Electric Co., Ltd., has issued a preliminary statement of the financial results for the year ended 31st March last. This shows that despite a rise of 10 per cent in sales, the group profits fell from £6,562,231 in 1955-56 to £6,168,170 last year, the fall being due to reduced profit margins. The statement says that the rise in costs continues. United Kingdom and overseas taxation requires £3,245,076 (against £3,280,169), and the net profit is £2,397,336 (£2,759,417), to which is added a net profit of £195,952 relating to previous years. It is proposed to pay a final dividend of 8 per cent, making 12½ per cent for the year on ordinary capital of £18,000,000. For the previous year the total distribution was 14 per cent on capital of £13,714,680 before a 3-for-10 rights issue.

Marryat & Scott Holdings, Ltd.—In his statement which has been circulated with the report and accounts for the year ended 31st March last, Mr. M. D. Scott (chairman and managing director) says that on a previous occasion he has explained a decline in trading profit as due to inability to complete a number of lift contracts within the trading period. This year building progress has been more in step with production, which is largely responsible for the increased profit. The completion of lift installations now continues at a satisfactory rate against a back-log of work in hand greater than was the case at this time last year. The number of maintenance contracts and the work of repair and reconstruction is increasing. They have recently received, in conjunction with F. & C. Osler (India), Ltd., one of the largest contracts for lifts ever placed in India for 28 heavy duty goods lifts for King George V and Kiddepore Docks, Calcutta.

James Scott & Co. (Electrical Engineers), Ltd.—The annual meeting will be held on 2nd August. In his circulated statement, Mr. I. Sclar (chairman and joint managing director) says that the turnover for the year ended 31st January last was again the highest in the history of the company. Overhead costs are, however, continually rising and profit margins are decreasing. In their Electronics Section, some of the first electronic development contracts have been completed, and repeat orders have been received for special equipment and electronic development work. They have acquired the business of Malcolm & Allan, Ltd., electrical contractors and motor engineers, Glasgow.

Orders in hand at the beginning of this financial year were again at a high level, and although there has been a slackening-off in transmission contracts, the Transmission Department has been well occupied and several hundred miles of overhead lines have been erected in Scotland and the North of England. The contracts with the United Kingdom Atomic Energy Authority at Springfields, Annan and Dounreay are developing and they have been awarded further extensions to their Dounreay contract. The retail section of their turnover has been fully maintained, and for the first five months of the current year the figures are in excess of last year's figures.

Venner, Ltd.—In his circulated review of the company's activities in 1956, Mr. A. A. Rowse (chairman) refers to the reduced profit and says that early in the year Australia cut her imports drastically and although the company held substantial orders import licences could not be obtained. The home market was under the influence of the credit squeeze and many schemes which would have called for their products had to be put aside for the time. Uncertainty as to defence policy, particularly as regards aircraft, induced a cautiousness on the part of aircraft manufacturers which led to a reduction or even a temporary cessation of demand and their factory loading in respect of aircraft components was seriously reduced. It is beginning to be apparent, however, that the situation is changing for the better and the output this year will almost certainly show an improvement.

With regard to the future, their parking meters have met with considerable success abroad and the aircraft work is beginning to move again. The time switch business continues highly competitive but they maintain a satisfactory sales volume. The battery business shows an encouraging trend and sales volume in the current year is likely to show a substantial increase. The electronics division is making steady progress and the board feels it has a promising future.

Ward & Goldstone, Ltd.—The accounts for the year to 31st March last show group trading profits of £1,047,206, as compared with £900,837 for the preceding year, and after deducting £431,687 for taxation the net profit is £440,210 (against £343,475). It is proposed to pay a final dividend of 27½ per cent (against 22½ per cent), making 40 per cent for the year (35 per cent). The balance carried forward is £609,971 (against £252,546 brought in).

The Pena Copper Mines, Ltd.—Subject to contract and the necessary resolutions for the increase in capital of the company, preliminary agreement has been reached for the acquisition of the whole of the issued share capital of Cosmocord, Ltd., manufacturers of moulded plastics and piezo-electric materials. Consideration for the acquisition will be the issue of £150,000 in new 6s 8d 8 per cent preference shares at par, and 321,563 new 6s 8d ordinary shares. Of this amount arrangements have been made with the vendors for the private placing of 125,490 ordinary shares. The balance will be retained by the vendors as an investment. Upon completion of the arrangements, Mr. A. Schuman, controlling shareholder and managing director of Cosmocord, Ltd., will join the board of the Pena Copper Mines, Ltd.

The Dubilier Condenser Co. (1925), Ltd., reports a trading profit for 1956-57 of £392,536, as compared with £428,743 for the preceding year. Taxation absorbs £157,038 and the net profit is £157,538 (against £190,715). The dividend for the year is maintained at 30 per cent, general reserve receives £107,756 and the balance carried forward is £123,832 (against £116,976 brought in). It is proposed to make a one-for-two scrip issue by capitalising £107,756.

Parmiter, Hope & Sugden, Ltd.—The consolidated net profit for the year to 31st March last is £35,583, as compared with £29,426 for the previous year. Taxation absorbed £46,677. The dividend for the year is unchanged at 30 per cent with a final payment of 22½ per cent. The balance carried forward is £33,437 (against £25,377 brought in).

Electrical Components, Ltd.—The group trading profit for 1956-57 amounts to £259,776, as compared with £252,117 for 1955-56. Taxation provision takes £141,049 and the net balance is £118,727 (against £120,024). It is proposed to pay a final dividend of 7½ per cent, making 12½ per cent for the year on doubled capital. The distribution for the previous year on the smaller capital was 25 per cent.

R. B. Pullin & Co., Ltd., have declared an interim dividend of 5 per cent (same) on increased capital.

Mather & Platt, Ltd., are paying an interim dividend of 4 per cent (unchanged).

Cable & Wireless (Holding), Ltd., has announced a second quarterly dividend of 2½ per cent (unchanged).

The Sun Electrical Co., Ltd., has declared an interim dividend of 5 per cent (unchanged).

Bankruptcies

T. E. Jones (trading as Barrington Jones), 138, Northgate Street, Chester, electrical engineer.—Application for discharge to be heard on 30th July at the Castle, Chester.

C. R. W. Rowed and **A. E. Smith,** trading at 1, Alexandra Road, Ellacombe, Torquay, electrical engineers and house decorators, trading as Rowed & Smith.—Last day for receiving proofs for dividend 30th July. Trustee, Mr. G. W. Sisman, 12, Pennsylvania Road, Exeter, Official Receiver.

G. S. Lacey, 74, St. Giles Street, Norwich, electrical engineer.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released 8th July.

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Illustration shows Dipole Aerial Mounting fabricated in Grade TH Permali for 'GEE' chain radio-navigational aid for aircraft. Designed by A. C. Cossor Ltd.

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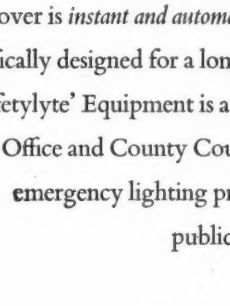
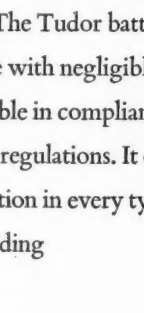
Please send for Publications Nos. 90/93 containing full details of the standard range of 'Safetylyte' Equipments. Comprehensive specifications for special emergency lighting installations prepared without obligation.



Double-tier stand holding typical battery of 14 Tudor sealed-type cells as used with 'Safetylyte' emergency lighting equipment.



'Safetylyte' Major charging and control cubicle.

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EMERGENCY LIGHTING EQUIPMENT

T.143

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NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) will be obtainable after 31st July from the Patent Office, 25, Southampton Buildings, London, W.C.2

1952

10872. Sparcatron, Ltd.—Methods and apparatus for cutting electrically conductive materials. 19th May, 1953. (Addition to 637872.) (780242.) 22173. Apparatus for cutting and working electrically conductive materials by electro-erosion or electrolysis. 8th October, 1953. (780121.)

1953

8906. Westinghouse Brake & Signal Co., Ltd., Walker, A. H. B., Burch, D. E., and Lockett, L. J.—Metal rectifier assemblies. 12th February, 1954. (Cognate application 14972, 29th May, 1953.) (780183.)

26845. Shardlow Electric Wires, Ltd., and Hargreaves, F. G.—Manufacture of insulated cables. 29th December, 1954. (780065.)

34940. Staatsbedrijf der Posterijen, Telegrafie en Telefonie.—Apparatus for storing digital data on a moving magnetic medium. 15th December, 1953. (780030.)

36242. Metropolitan-Vickers Electrical Co., Ltd.—Electric motor equipments for hoists, winders, and the like. 30th December, 1954. (780423.)

1954

46. Standard Telephones & Cables, Ltd. —Electromagnetic wave filters of large bandwidth. 1st January, 1954. (780231.)

155. General Electric Co.—Refrigerators. 4th January, 1954. (780006.)

494. British Thomson-Houston Co., Ltd. —Apparatus for use in the manufacture of crystal contact devices. 29th December, 1954. (780320.)

649. Sylvania Electric Products, Inc.— Electroluminescent lamps. 8th January, 1954. (780162.)

4826. Pye, Ltd.—Junction transistors. 18th February, 1955. (780251.)

5929. Tesla, Narodni Podnik.—Apparatus for measuring the time of energisation and de-energisation of electric relays. 1st March, 1954. (780068.)

6386. Marconi's Wireless Telegraph Co., Ltd.—Automatic tuning control devices. 20th January, 1955. (780252.)

8650. Bliss, J. L., and Rainger, P.— Inversion of television signals. 23rd March, 1955. (780069.)

8800. Edison Swan Electric Co., Ltd.— Cooling devices for thermionic valves. 25th March, 1955. (Cognate applications 13156, 5th May, 1954, and 30072, 19th October, 1954.) (780323.)

12519. Electric & Musical Industries, Ltd. —Radio links. 12th April, 1955. (780060.)

14511. Electric & Musical Industries, Ltd.—Wired electrical signal distributing systems. 6th May, 1955. (780324.)

15343. Philips Electrical Industries, Ltd. —Metallic arc welding electrodes. 24th August, 1955. (780326.)

17726. English Electric Co., Ltd.— Regulating systems for dynamo-electric machines. 10th June, 1955. (780009.)

17767. Telefunken Ges.—Electrical asymmetrical conducting devices having a crystalline semi-conductor. 17th June, 1954. (780260.)

17852. Brentford Transformers, Ltd.— Electric regulating apparatus. 13th June, 1955. (780166.)

18591. Smith & Sons (England), Ltd., S. —Electrical follow-up systems. 24th June, 1955. (780010.)

22644. British Telecommunications Research, Ltd.—Electric pulse generating circuits. 4th August, 1955. (780232.)

25351. Electric & Musical Industries, Ltd. —Methods and apparatus for monitoring electric signals. 11th August, 1955. (780267.)

26967. Cator, W. S.—Electric plug and socket couplings. 14th September, 1955. (780077.)

27003. British Tabulating Machine Co., Ltd.—Electronic calculating apparatus. 17th September, 1954. (780431.)

27677. United Gas Industries, Ltd.— Means for indicating the apparent consumption in a.c. circuits. 22nd September, 1955. (780432.)

28145. Bodetz, W. H. J.—Electric lamps. 29th September, 1954. (780201.)

28170. Electric & Musical Industries, Ltd. —Binaural sound transmission systems. 30th September, 1955. (780337.)

29346. Hirschmann, F.—Electric transformer. 12th October, 1955. (780079.)

31001. Licentia Patent-Verwaltungs-Ges. —Mechanical current convertor (contact rectifier) with commutating reactors. 27th October, 1954. (780016.)

31701. General Electric Co., Ltd.—Electric heating apparatus. 2nd November, 1955. (780437.)

31765. Kolster-Brandes, Ltd.—Television receivers. 3rd November, 1954. (780170.)

34811. Philips Electrical Industries, Ltd. —Ion traps in cathode-ray tubes. 1st December, 1954. (780040.)

34851. Irvine, A. M.—Portable electric fires for domestic heating. 28th November, 1955. (780340.)

35082. Goldstaub, H. H.—Electrical heating devices. 29th July, 1955. (780085.)

35530. Foster, K., and Thiele, A. P. C. —Electromagnetic wave radiators. 28th November, 1955. (780086.)

35845. British Thomson-Houston Co., Ltd.—Electrical storage apparatus. 1st December, 1955. (780019.)

35859. Link Aviation, Inc.—Electrical circuits. 10th December, 1954. (780172.)

1955

516. Deutscher Spinnereimaschinenbau Indolstadt, Niederlassung der Schubert & Salzer Maschinenfabrik Akt.-Ges.—Electrical control systems. 7th January, 1955. (780174.)

4480. Oak Mfg. Co.—Electrical apparatus particularly in making connection to a member having a thin conductive layer thereon. 15th February, 1955. (780092.)

4977. Kelvin & Hughes, Ltd.—Magnetostrictive transducers. 7th February, 1956. (780209.)

7777. Marconi's Wireless Telegraph Co., Ltd.—Radar systems. 16th December, 1955. (780211.)

7958. Western Electric Co., Inc.— Negative impedance convertors. 18th March, 1955. (780177.)

8640. Telefonaktiebolaget L. M. Ericsson.—Pulse time modulators. 24th March, 1955. (780351.)

8975. Eitel-McCullough, Inc.—Electron tubes having a ceramic portion. 28th March, 1955. (780130.)

9969. Corning Glass Works.—Electrical condensers. 5th April, 1955. (780133.)

12511. Standard Telephones & Cables, Ltd.—Travelling-wave tubes. 29th April, 1955. (780050.)

14020. Commissariat à l'Energie Atomique. —Nuclear reactors provided with a neutron flux measurement device. 16th May, 1955. (780219.)

14413. Telefonaktiebolaget L. M. Ericsson.—Telephone selector systems. 18th May, 1955. (780387.)

15614. Siemens & Halske Akt.-Ges.— Gas-discharge tube circuit arrangements. 31st May, 1955. (780358.)

17297. Radio Corporation of America.— Colour television receiver. 15th June, 1955. (780389.)

17634. Preh, W., and Preh, A. (trading as Preh, Elektrofeinmechanische Werke, J. Preh Nachfolger).—Contact arrangements in electric switches. 17th June, 1955. (780222.)

18103. Commissariat à l'Energie Atomique. —Ionisation chambers. 22nd June, 1955. (780283.)

18266. Ericsson Telephones, Ltd., and Hallam, T. W. M.—Electromagnetic vibratory interrupters. 24th June, 1955. (780454.)

18645. Siemens & Halske Akt.-Ges.— Semi-conductor junctions and processes for the production of such junctions. 28th June, 1955. (780455.)

19154. General Electric Co.—Insulating compositions containing epoxide resins. 1st July, 1955. (780051.)

19917. Dorman & Smith, Ltd.—Mounting of circuit-breakers in distribution boards. 3rd February, 1956. (780226.)

20580. Specialties Development Corporation.—Time delay electric control devices. 15th July, 1955. (780285.)

21546. Ateliers des Charmilles Soc. Anon. —Machines for machining conducting material by means of electric discharges. 26th July, 1955. (780138.) 22564. Machines for the electric machining of conductive materials. 5th August, 1955. (780139.)

23080. Metropolitan-Vickers Electrical Co., Ltd.—Electronic time-base generators. 10th August, 1955. (780109.)

23202. Krug, C.—Electrical control systems for machine tools. 11th August, 1955. (780110.)

24383. Sylvania Electric Products, Inc.— Machines for making stems for electric lamps and discharge tubes. 24th August, 1955. (780394.)

25860. Hazeltine Corporation.—Transistor ring counter. 9th September, 1955. (780395.)

26133. Babcock & Wilcox, Ltd.—Stoker fired, tubulous vapour generating and superheating units. 13th September, 1955. (780371.)

27785. Hoover, Ltd.—Electric irons. 29th September, 1955. (780396.)

27878. Western Electric Co., Inc.—Electric meter circuits. 30th September, 1955. (780118.)

28620. Standard Telephones & Cables, Ltd.—Radio frequency propagating systems. 7th October, 1955. (780054.)

29570. General Electric Co.—Electric connecting arrangements of the slipring kind. 17th October, 1955. (780146.)

30353. Wilcolator Co.—Electric circuit-breaker and bimetal thermostatic unit therefor. 24th October, 1955. (780292.)

30600. Erie Resistor Corporation.— Method of making capacitors. 26th October, 1955. (780373.)

31597. Standard Telephones & Cables, Ltd.—Radio frequency transformer. 4th November, 1955. (780378.)

32837. Sylvania Electric Products, Inc.— High voltage tube socket. 16th November, 1955. (780149.)

32968. Toyo Denki Seizo Kabushiki Kaisha.—Speed controlling system for polyphase commutator motors. 17th November, 1955. (780150.)

34018. Standard Telephones & Cables, Ltd.—Carrier wave generators. 28th November, 1955. (780152.)

1956

941. Allmanna Svenska Elektriska Aktiebolaget.—Temperature controller or overheating safeguard device for electrical hot plates. 11th January, 1956. (780158.)

7553. Telefonaktiebolaget L. M. Ericsson.—Telephone instruments. 9th March, 1956. (780179.)

10801. Murphy & Sons (Engineers), Ltd., J., and Murphy, P. G.—Automatic time controlled switching device for the energising of an electrical circuit. 9th April, 1956. (780470.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Ashford (Kent).—U.D.C. 19th August. Street lighting equipment. (See this issue.)

Australia.—Electricity Commission of New South Wales. 26th August. 11 kV isolating switches. (E.S.B. 17259/57. Ten/26948.)*

G.P.O., Melbourne. 5th September. Switchboards. (E.S.B. 17208/57. Ten/26918.)*

Snowy Mountain Hydro-Electric Authority. 10th September. Telemetering equipment for power system control and tariff metering. (E.S.B. 16956/57. Ten/26900.)*

Victorian Railways, Melbourne. 25th September. Electric train equipment. (E.S.B. 16894/57. Ten/26872.)*

Ballymoney (Co. Antrim).—Governors of Dalriada School. 29th July. Electrical installation in the existing building. J. R. W. Murland, consulting engineer, 13, Wellington Place, Belfast.

Burma.—Burma Purchase Board, Rangoon. 1st August. Electric lighting fittings. (E.S.B. 17691/57. Ten/27065.)* Electric lamps. (E.S.B. 17693/57. Ten/27050.)* 5th August. Electric fans. (E.S.B. 17698/57. Ten/27045.)* Sockets, street and angle fittings and lampholders. (E.S.B. 17699/57. Ten/27046.)* 7th August. Carbon brushes. (E.S.B. 17472/57. Ten/27024.)* Triple-pole ironclad main switches. (E.S.B. 17474/57. Ten/27020.)*

Chelmsford.—Corporation. 21st August. Street lighting equipment. (See this issue.)

Dundee. — Corporation. 3rd August. Street lighting equipment. (See this issue.)

Greece.—Ministry of Finance, Athens. 31st July. Six portable power plants. (E.S.B. 17658/57. Ten/27060.)*

State Procurement Service, Athens. 7th August. Apparatus for measurement of radio communications. (E.S.B. 17077/57. Ten/26947.)*

India. — Electricity Department, Uttar Pradesh. 31st August. Power line carrier communication telemetering and telephone equipment. (E.S.B. 16903/57. Ten/26890.)*

Government of Assam Electricity Department, Shillong. 16th September. 11/33, 11/66 and 11/4 kV transformers for Cherrapunji power station. (E.S.B. 16965/57. Ten/26910.)*

Ipswich.—19th August. Street lighting equipment. (See this issue.)

London.—Lewisham Borough Council. 19th August. Street lighting equipment. (See this issue.)

Philippines.—National Power Corporation, Manila. 17th September. Complete hydro-electric plant, including 580 h.p. turbine, 500 kVA generator, 500 kVA transformer, etc. (E.S.B. 16942/57. Ten/26896.)*

Rhodesia and Nyasaland. — City of Bulawayo. 7th August. Secondary street lighting lanterns and fluorescent street lighting fittings and tubes. (E.S.B. 17260/57. Ten/26934.)*

South Africa.—Stores Department, South African Railways, Johannesburg. 31st July. Electric furnace. (E.S.B. 17264/57. Ten/26959.)* 2nd August. Coach batteries. (E.S.B. 16815/57. Ten/26871.)* Electric cable. (E.S.B. 16812/57. Ten/26850.)* 7th August. Radio telephone link. (E.S.B. 17269/57. Ten/26931.)* Micanite commutator sheets. (E.S.B. 17270/57. Ten/27027.)* 14th August. Public address equipment. (E.S.B. 17422/57. Ten/26963.)* Electric cable. (E.S.B. 17423/57. Ten/26955.)*

Durban Electricity Department. 16th August. E.h.v. automatic circuit reclosers. (E.S.B. 17330/57. Ten/26961.)*

Southend-on-Sea. — Corporation. 9th August. Electrical installation in junior mixed school. (See this issue.)

Spain.—Empresa Nacional Hidroeléctrica del Ribagorzana, Barcelona. 8th August. Circuit-breakers. (E.S.B. 17612/57.I.C.A. Ten/27015.)*

Electricas Reunidas de Zaragoza. 5th August. Circuit-breakers and telephonic equipment. (E.S.B. 17446/57.I.C.A. Ten/26987.)*

Sunderland.—Corporation. 15th August. Electrical installations in secondary schools. (See this issue.)

Turkey.—Allied Land Forces, South-Eastern Europe, Izmir. 5th August. One 100 kVA transformer, one 200 MVA circuit-breaker and two maximum current relays. (E.S.B. 17661/57. Ten/27052.)*

United States.—Corps of Engineers, Alabama. 6th August. Four 36,111 kVA generators. (E.S.B. 17908/57. Ten/27146.)*

Wolverhampton. — Corporation. 19th August. Street lighting equipment. (See this issue.)

* Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Birmingham.—Eight-storey block of flats, and four four-storey blocks of maisonnettes, Sparkhill; city architect, Civic Centre, 1.

Bristol.—Two 15-storey and one 11-storey blocks of flats, Barton Hill; city architect.

Burnley.—Factory, Heasandford; Michelin Tyre Co., Ltd., Boothen Estate, Stoke-on-Trent.

Cheltenham.—Factory for H. Packer & Co., Ltd., 23, Tewkesbury Road; L. W. Barnard & Partners, architects, 13, Imperial Square.

Houses and flats (279), Hatherley; borough engineer, Municipal Offices.

Cheshunt.—Factory and offices; Bagshaw & Morris, Ltd., 74, Great Eastern Street, London, E.C.2.

Cleethorpes.—New block at Clee Grammar School comprising dining room, kitchen and gymnasium (£29,000); county architect, Lindsey C.C., Lincoln.

Coventry.—Factory extension, Brown's Lane, Allesley; Jaguar Cars, Ltd.

Dartford.—Houses (190), Downs estate, Princes Road; W. J. Simms, Sons & Cooke, Ltd., builders, 78, Mount Street, London, W.1.

Factory; Martin Welding & Cutting Co., Ltd., Burnham Road.

Doncaster.—Factory, Wheatley Hall industrial estate; Heath & Smith, Ltd., Wood Street.

Durham.—Infants' school at Newton Aycliffe; county architect, South Street, Durham.

Edinburgh.—Large additions to premises, Leith (£129,000); Scottish Agricultural Industries, Ltd., Charlotte Street, Leith.

Guildford.—Civic hall; Bridgwater & Shepheard, architects, 42, Bruton Place, London, W.1.

Hailsham.—Neurosis unit at Hellingly Hospital (£117,738); T. Braybon & Son, Ltd., builders, North Street, Brighton.

Hanley (Staffs).—Colour factory, Clough Street; Martin Colour Co., Ltd., Gate Street Mills.

Harlow.—First of four phases of scheme for new hospital (£2,000,000), for North East Metropolitan Regional Hospital Board; Easton & Robertson, architects, 53, Bedford Square, London, W.C.1.

Hereford.—Dwellings (240), Green Lane estate; city surveyor.

Works extensions; Saunders Valve Co., Ltd., Blackfriars Street.

London.—Office block, City Road; Hammerson Estates, Ltd., Quadrex House, Park Lane, W.1.

Block of flats, Grosvenor Square and South Audley Street; John Brewster, architect, 16, Porchester Place, W.2.

Manchester. — Study-bedroom block, Y.M.C.A., Alexandra Park; Harry S. Fairhurst & Son, architects, 55, Brown Street.

Nine-storey office block, King Street and Brown Street; Norwich Union Insurance Society, Norwich.

Domestic and trades college (£616,725); city architect.

Middlesbrough.—R.C. secondary school, Roseberry Road; K. J. Caton, architect, Woodlands Road.

Newcastle-on-Tyne.—Shopping centres on the Longbenton estate (19 shops) and Kenton North estate (20 shops); city architect, 18, Cloth Market.

North Riding.—New schools at Catterick, Eston and Stokesley, and additions to Richmond Grammar School, Northallerton Grammar School, and Scarborough High School; school architect, County Hall, Northallerton.

Old Leake.—First instalment of county secondary school (£108,785) in 1958/59 programme of Holland C.C.; county architect, Boston.

Peterborough.—New Roman Catholic secondary school (£94,383); H. J. Firman, Ltd., Newark Road, Peterborough.

Second stage of Dogsthorpe-Newark Primary School (£52,600); Joint Education Board's architect, Bridge Street.

Romford.—Operating theatre suite, Harold Wood Hospital; N.E. Metropolitan Regional Hospital Board, 3-4, Queen Anne Street, W.1.

Rugby.—R.C. church, presbytery and parish hall, Alwyn Road/Lime Tree Avenue site; Rev. D. Hogan, St. Marie's Presbytery, Dunchurch Road.

Sheffield.—Outpatients' and teaching block, Glossop Road; Adams, Holden & Pearson, architects, 38, Gordon Square, London, W.C.1.

Stirlingshire.—Houses (96), Airth, Glen Village and Lauriston; county architect, County Offices, Viewforth, Stirling.

Walton-on-Thames.—Remodelling pumping station (£704,900); Metropolitan Water Board, New River Head, Rosebery Avenue, London, E.C.1.

Warwickshire.—County technical school at Coleshill (£103,550) and county grammar school at Sutton Coldfield (£192,700); county architect, Shire Hall, Warwick.

Weymouth.—Erection of theatre and dance hall at old Ritz Theatre site; Veale and Sanders, quantity surveyors, 19, Hanover Square, London, W.1.

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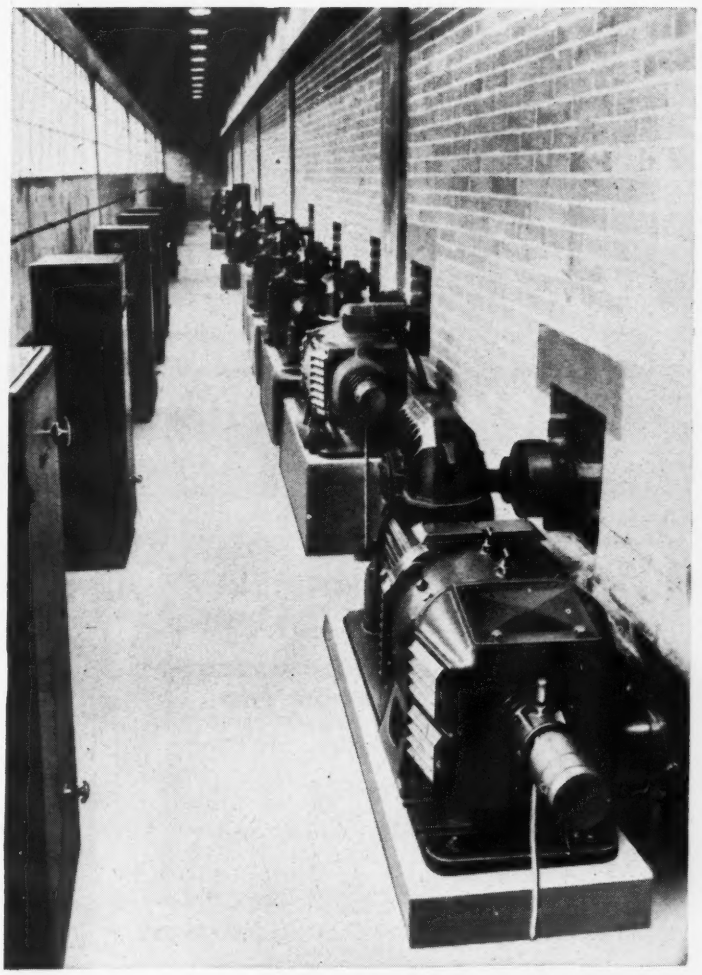
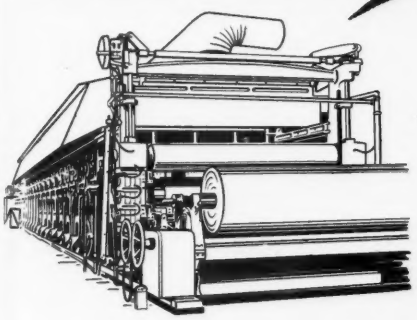
The illustration shows the section motors and control cubicles for the No. 8 machine at the Papermakers Limited mill of Associated Pulp and Paper Mills Pty., Limited, Burnie, Tasmania.



The drive annexe with section motors and control cubicles.



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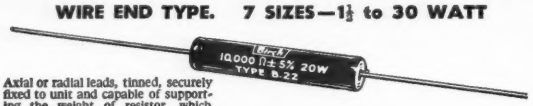
WIRE END TYPE. 7 SIZES—1½ to 30 WATT



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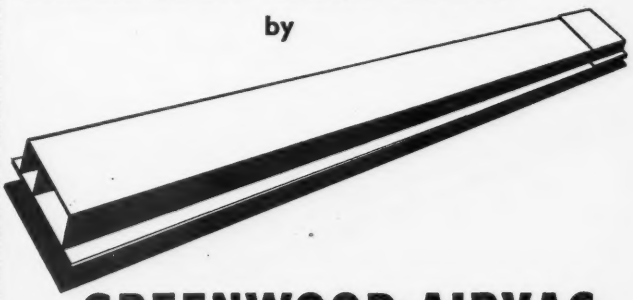
UNDERFLOOR CABLE DUCTS
by



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Greenwood-Airvac patent conduit system was installed in Haymarket House — one of the many new buildings so equipped.

The publication 'Greenwood-Airvac Conduit Systems' tells you more about these cable ducts. Please write for a copy.

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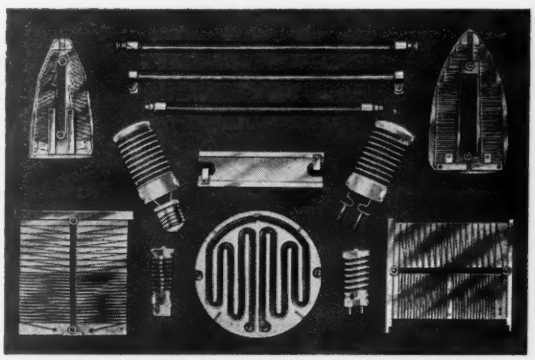

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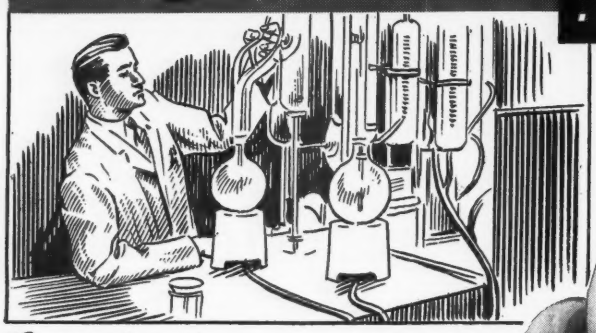

Flask Heaters. Illustration shows a Three Heat Laboratory Flask Heater Rating: 750w. Voltage: 200/250. Sheath material: Inconel.

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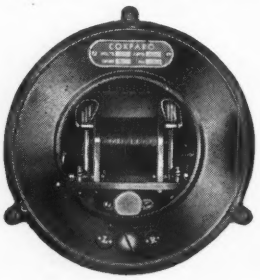

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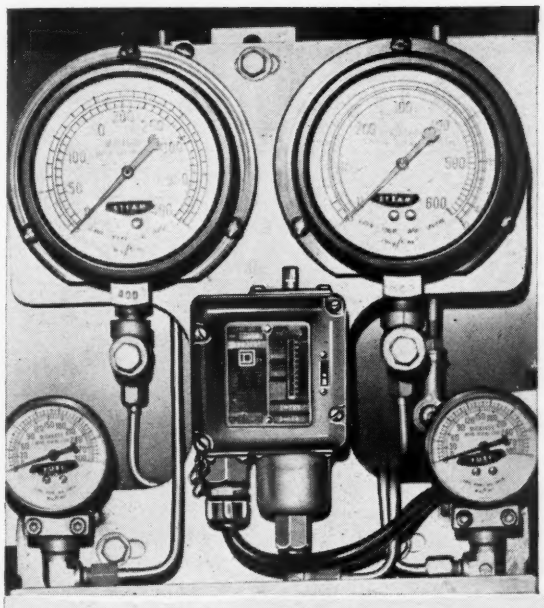

demands

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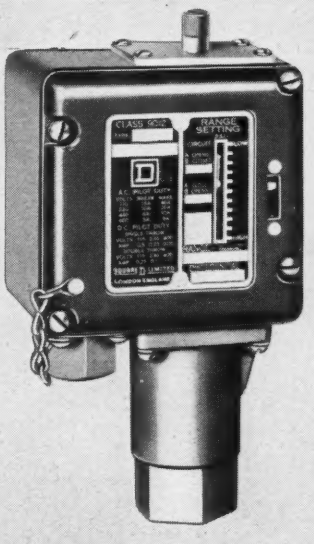
Pressure Switches

For the steam generator units built by J. Stone (Deptford) Limited as supplied for world-wide use on diesel locomotives, the pressure switches are required to be of extremely robust construction. They must withstand arduous day in, day out railway service and they must have repeat accuracy. Square D drip-tight and oil-resistant pressure switches, monitoring atomising air or steam pressure, meet these exacting requirements.



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- ★ Heavy-duty, quick-action snap switch
- ★ Eight variations of basic switch
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- ★ Pneumatic and Hydraulic operation

And for Machine Tools

Square D Pressure Switches are unequalled for machine tool applications. Take, for instance, one application where operating rates up to 300 per minute are sustained without false operation or flutter. Square D Switches are best for locomotives —and for *your* job!

CLASS 9012 PRESSURE SWITCHES — one of many control system components made in Britain by Square D Limited — are available "off-the-shelf"

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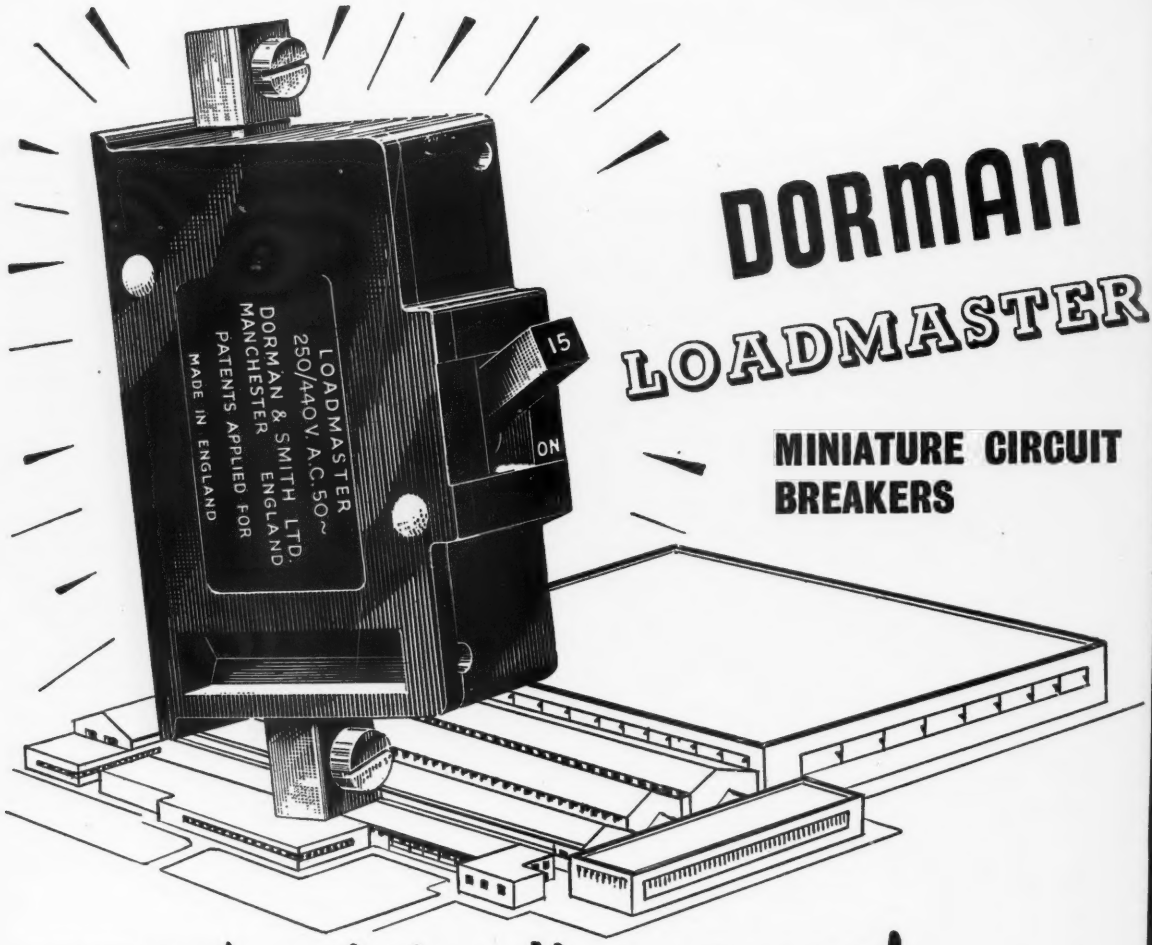

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Yes ! Electrical Contractors know just how successful the LOADMASTER Miniature Circuit Breaker system has proved for the control of lighting, heating and auxiliary circuits. These units establish a new efficiency in circuit protection coupled with low installation costs and minimum servicing expense. Here are just a few of the more recent installations . . . large departmental stores . . . pharmaceutical factory . . . secondary modern schools . . . airfield hangars and administrative blocks . . . Independent TV studios.

LOADMASTER is now available in 5, 10, 15, 30 and 50 amp. ratings. Standard distribution board arrangements are up to 16 way for S.P. & N. and for domestic installations there is the new LOADMASTER consumer unit.

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POSITION .....

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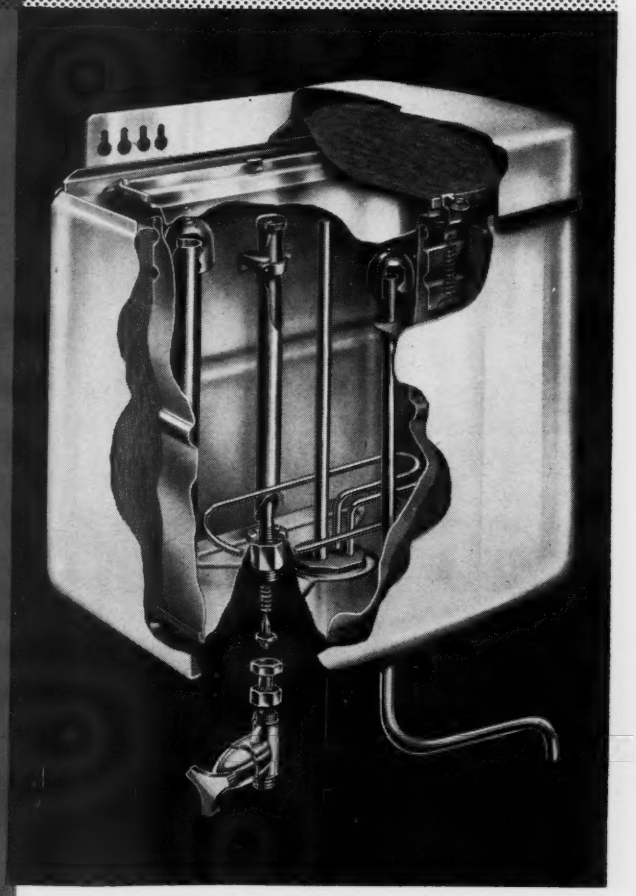
Creda Crusader

with

Automatic Restrictor Valve!



right-first-time installations with the new Creda Crusader! thanks to Creda's exclusive Automatic Restrictor . . . the valve that gives the right setting infallibly—without any adjustment!

District and time variations in water supply pressures are all one to the new Crusader. No longer need an adjustable restrictor be set or selected when the heater is installed. The new Crusader automatic flow restrictor needs no setting or adjustment; it controls the flow rate to ensure perfect operation at pressures from 10 to 100 lbs per square inch. It cannot of course cut off the water flow completely—even when pressures are below 7 lb per square inch. If the heater is fed from a low level storage tank—the plunger need only be removed from the body of the restrictor to obtain satisfactory operation. With this new Creda refinement the Crusader becomes the easiest-to-install water heater on the market

two more Creda Crusader improvements

SPRING CLIPS now retain the lid of the water container. Easier removal—positive fastening

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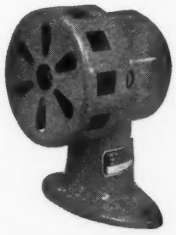
★ **To all Factory owners, electrical contractors and others who have the responsibility to decide what type of alarm and how many we make the above offer of our "M" type siren.**

★ **This has been designed to "cut through" all noise levels in factories. These sirens can be supplied to work on any voltage AC or DC.**

★ **Easily portable (weight 4 lbs.) and can be carried round to every department and plugged into any convenient lighting point so as to determine the number required for the whole factory.**



WAILERS: To produce the wailing note on the siren, a wailer can be supplied which can operate any number of sirens.

INDICATORS: Where it is desired to notify a central point where an alarm point has been operated we have electrically illuminated indicators. This, in addition to showing the position, will give an audible signal in any desired point, fire dept., engineers' office, etc. Fire calls can also be arranged to be transmitted direct to nearest Fire Station.

Our sirens, alarm pushes, and all our equipment are in accordance with the "British standards code of practice" and has the approval of Factory Inspectors.

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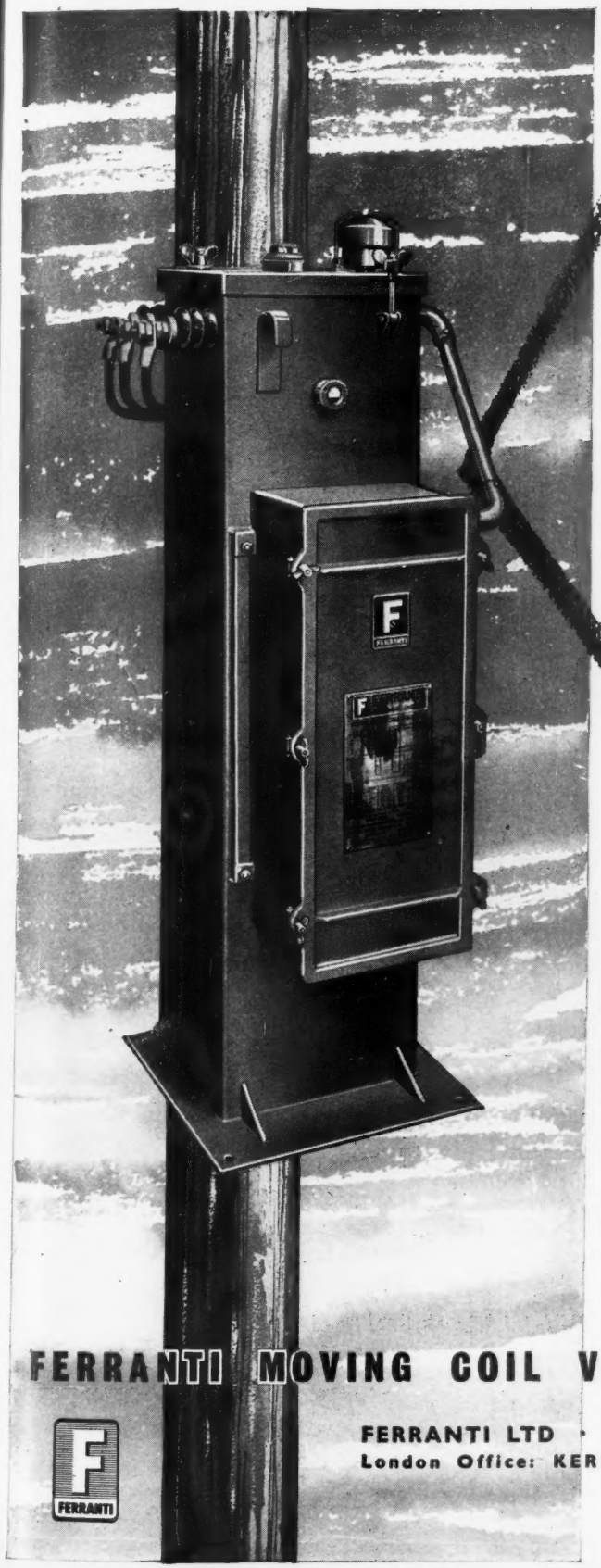

This regulator can solve 4 different voltage problems

* Gives alternative voltage ranges of
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  +0% to −20%
  +10% to −10%
  +10% to −18%
  on nominal 200-250 volts single phase supplies.
* Enables voltage regulation to be suited to system requirements.
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* Stepless regulation and voltage maintained within ± 1%
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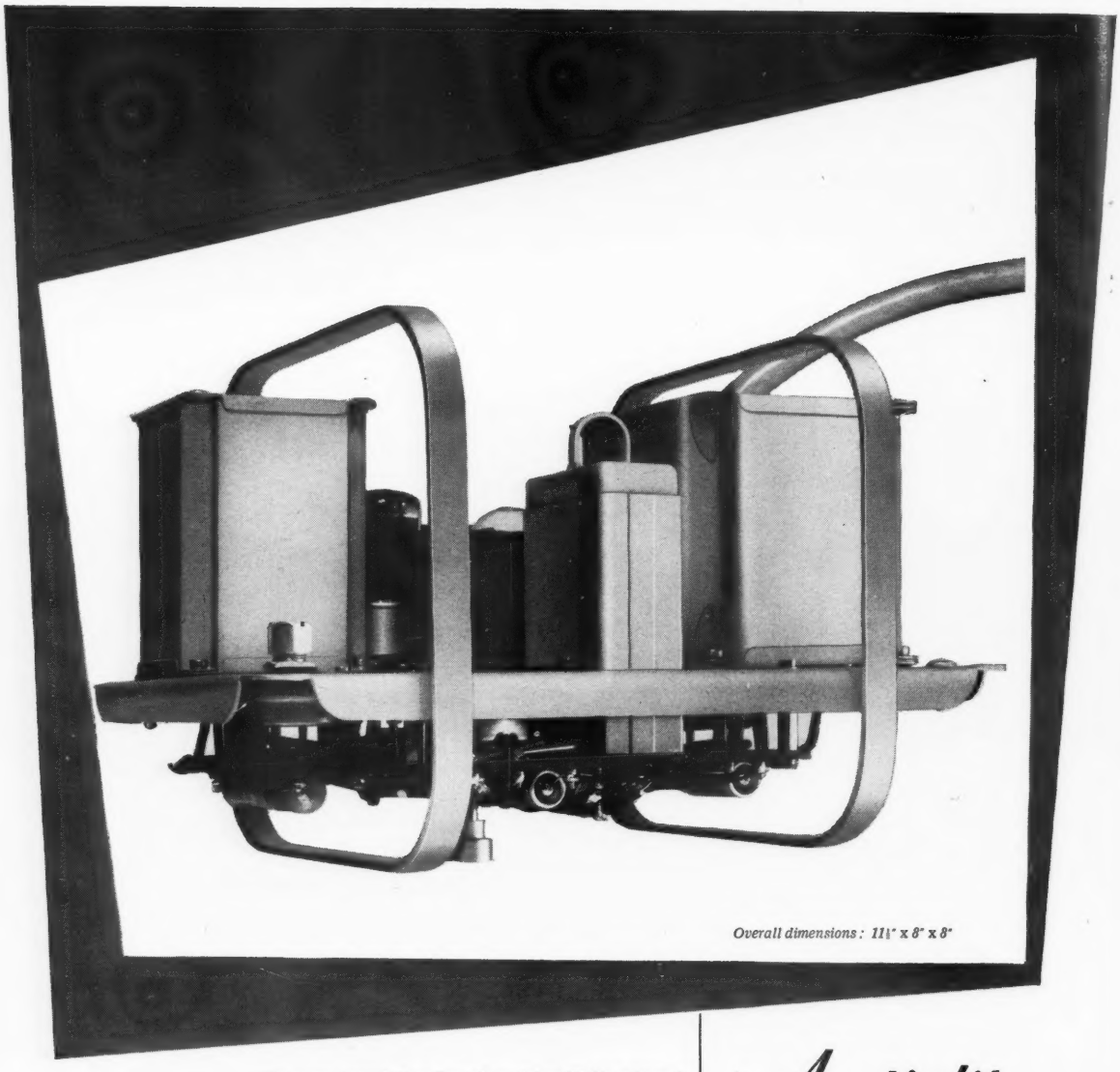
Synchronising AUTOMATICALLY



Overall dimensions: 11½" x 8" x 8"

The new Austinlite Synchronising Unit cuts out the need for complex and time-taking precautions when switching an A.C. generator into an already running A.C. system. The Unit detects voltages, phases and frequencies and, when these are all in step with the system, the generator is paralleled and can be safely switched in.

More than this, with auxiliary apparatus additional generators can be automatically started up, synchronised and connected with the system —and later disconnected—as the power demand fluctuates. The Austinlite Synchroniser can again be combined with other apparatus to form a load sharing device between two paralleled generators.

Simple in design, the Austinlite Synchroniser is self-contained, built on a small chassis suitable for back-of-panel mounting. Installation is an easy matter : little or no maintenance is needed. It can, if required, be used as a conversion unit with existing generating plant.

Let us give you a more detailed description of this unit.

Austinlite

ELECTRICAL EQUIPMENT

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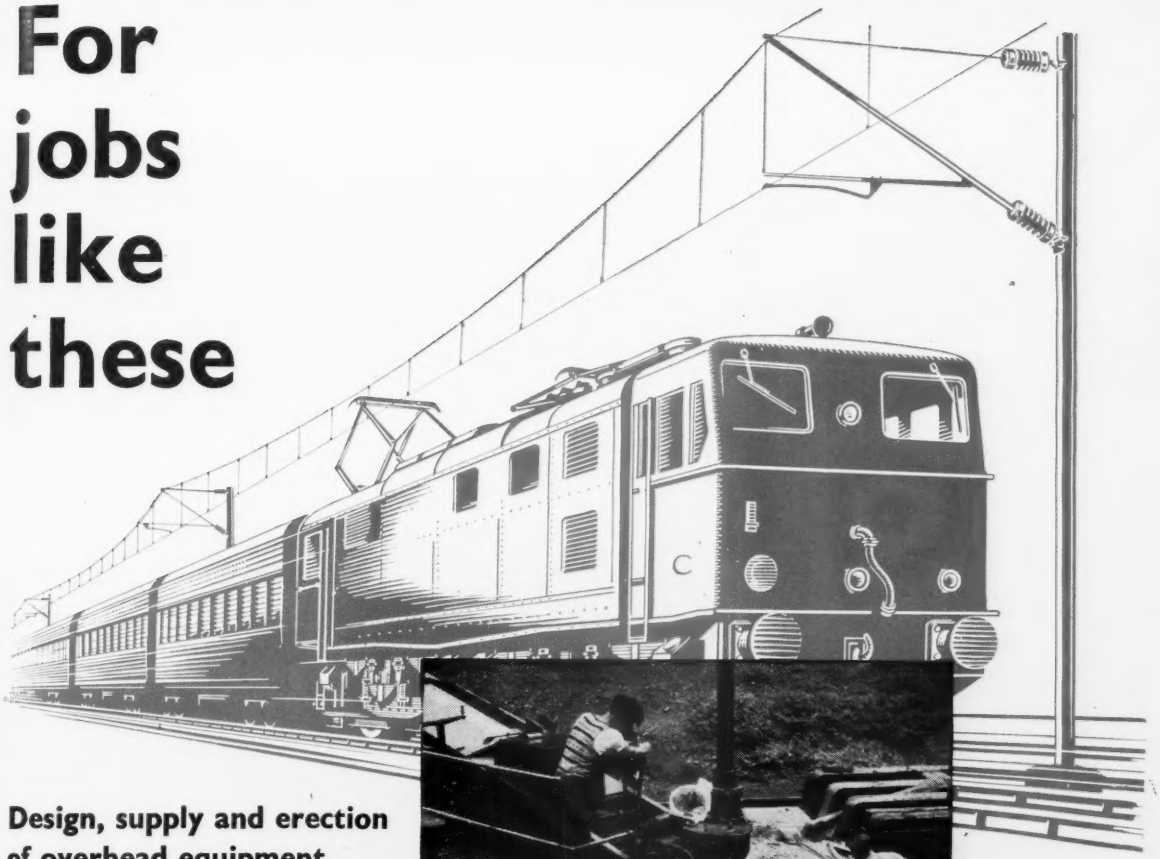

Design, supply and erection of overhead equipment for railway electrification

. . . illustrating the installation of supporting structures by mechanical plant.

Earth auger in action. The soil is removed by spinning the auger head.

British Insulated Callender's Construction Company Limited

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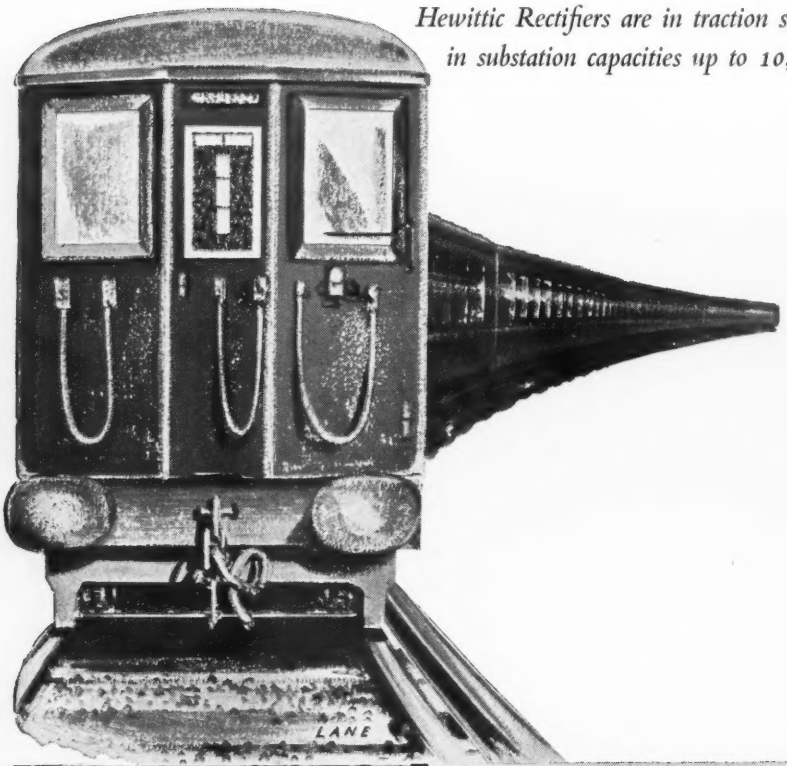
Steelwork crew planting a mast into a ground frame.

Pouring concrete into augered hole, in which a mast has been set in a ground frame.

Hewittic Rectifiers have replaced rotary converters at Waterloo Substation, supplying D.C. power to the eight main line tracks and serving all 21 platforms at Waterloo Railway Terminus, as well as supplying D.C. power to the Waterloo and City Railway.

117,500 kW of Hewittic Rectifiers 660/750 volts D.C. are being installed by the British Transport Commission in 28 substations on the Southern Region of British Railways.

Hewittic Rectifiers are in traction service in 18 countries in substation capacities up to 10,000 kW.



D.C. POWER

at Waterloo, one of the world's largest Railway Termini, is supplied through Hewittic Rectifiers

Left: Two of three 2,500 kW banks of Hewittic Rectifiers in service during the course of conversion of Waterloo Substation, and right: a view of the approaches to Waterloo station.

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BRITISH STANDARD 842+

CRABTREE

B. S. Requirements

B.S. 842 (*Voltage Operated Earth-Leakage Circuit Breakers*) specifies that the breaker shall trip instantaneously under fault conditions; that the mechanism shall be trip-free, making it impossible for the breaker to be held in the closed position under fault conditions; and that the breaker shall operate at less than 40 volt. with a resistance of 500 ohms and 24 volt. with a resistance of 200 ohms. The presence of a test switch is also required and all terminals should be clearly and permanently marked for identification.

Extra Crabtree Features

Whilst complying fully with the above specification, the Crabtree Type E-60 unit embodies many new and interesting features. The mechanism is contained in a factory-sealed enclosure; there is positive OFF-ON indication and the easy from-the-front wiring features will be particularly appreciated. Tested at an A.S.T.A. Approved Short-Circuit Testing Station, the breaker has an excellent rupturing capacity, whilst the unit is available either with or without overload protection. Full details of these and other features will be found in Publication No. 1179, available on request.

The TYPE E-60 EARTH-LEAKAGE CIRCUIT BREAKER

NEW *AND BETTER* EARTH-LEAKAGE PROTECTION BY CRABTREE

"*Crabtree*" (*Registered*)

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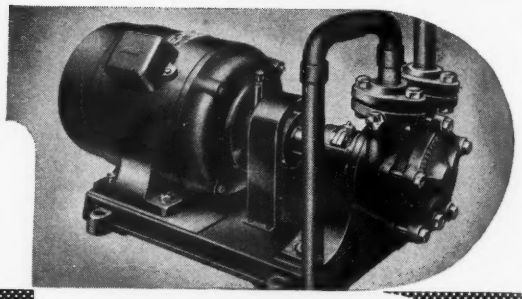

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These compact, practical little pumps will deliver up to 1,200 g.p.h., can be auto-operated, have few parts and little to go wrong, yet an electrically driven unit for single phase, A.C. supply costs only £25.1.6d. They are ideal for domestic water supply, agricultural and industrial use, are built to last and will give years of trouble-free service. May we send you full details? — please ask for list P.F.100.

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- **Surface.** With pattress. Optional, I.E.E. 207G backplate.
- Safety shuttered.
- Large terminals, easily wired.
- Slow break switch, silver contacts, nylon pad, quiet and positive action (Prov. Pat.).
- Robust plug, block terminals. B.S. 1362 cartridge fuse-link. Optional, High Impact type.

BACKPLATES. I.E.E. Reg. 207G. Backplates are supplied with the surface units, unless order states not required. Surface unit prices then 1/- doz. less.

FUSED PLUGS. Are not included in the price table shown. Cat. Nos. PG 13 Brown 39/- doz., PG 14 Cream 43/- doz., PG 15 Black, High Impact, 49/- doz. Each includes 13 Amp. Fuse-link as standard.

CARTRIDGE FUSE-LINKS. B.S. 1362. 13 Amp. Brown, 10 Amp. Yellow, 5 Amp. Grey, 2 Amp. Blue. All 7/- doz.

SOCKET-OUTLETS				SWITCHSOCKET-OUTLETS	
Cat. No.	Price Doz.	Mounting	Colour	Cat. No.	Price Doz.
SK 31	46/-	Surface	Brown	SS 31	72/-
SK 32	52/-	Surface	Cream	SS 32	78/-
SK 35	44/-	Flush	Brown	SS 35	70/-
SK 36	50/-	Flush	Cream	SS 36	76/-

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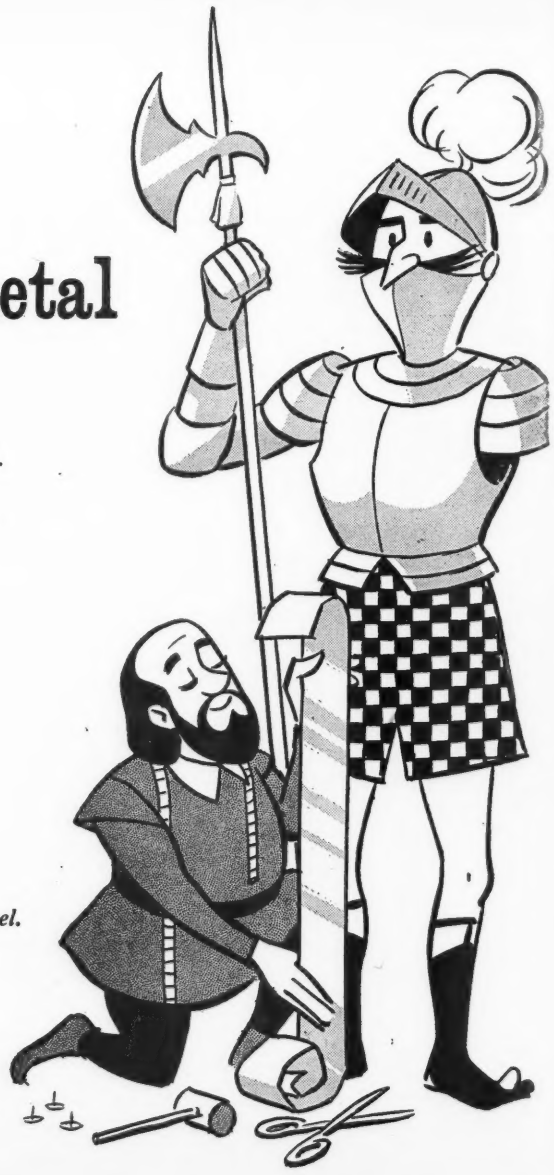
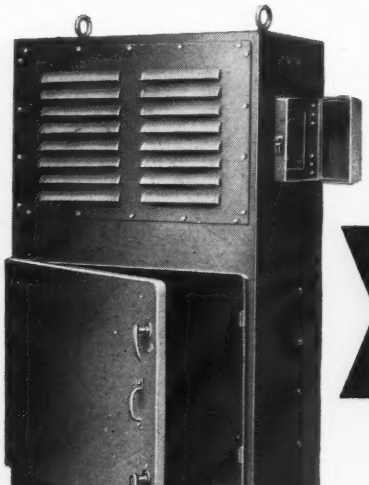


Illustrated here is a switch-gear housing, an example of one of our many fabrications in sheet steel.



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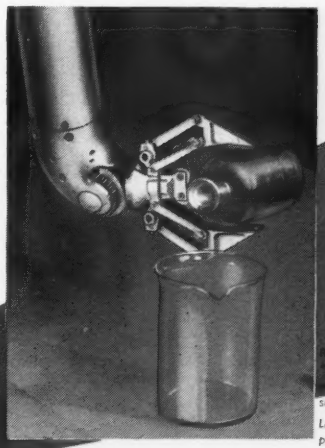
Members of the Warne-Wright Group
—who are large scale manufacturers of Nuts and Bolts, Repetition Parts, Stampings and Pressings and Drop Forgings for all Industries

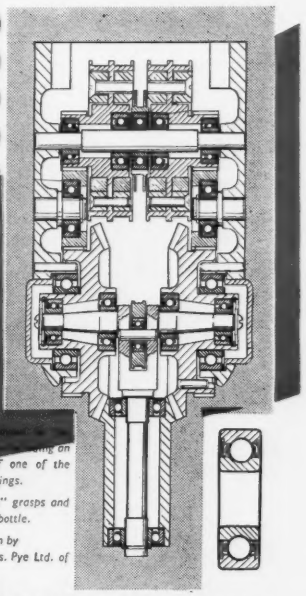
The MASTER-SLAVE MANIPULATOR is "alive" with Hoffmann Bearings

There are about 220 of them — ball journals in non-corrodible steel, mostly in the miniature range and mostly of the shielded type as shown on the drawing of the differential "wrist" assembly. The smallest bearing used is only $\frac{5}{16}$" outside diameter.

All pivots, pulleys and rollers are fitted with them to reduce frictional resistance to the very lowest level and by smooth motion combined with entire absence of shake, to facilitate the exact transmission of the operator's movements to the slave "hands" within the atomic chamber.

We have worked throughout in the closest collaboration with Messrs. Pye Ltd. of Cambridge and congratulate them on having received substantial orders for these Manipulators. A ready sale at home and abroad is anticipated.





RIGHT Bearing [illegible] View of one of the shielded ball bearings.

LEFT Slave "hand" grasps and pours contents of bottle.

Illustrations shown by courtesy of Messrs. Pye Ltd. of Cambridge

HOFFMANN

SMALL BALL JOURNAL BEARINGS

Your problem too may be modern — we can help you

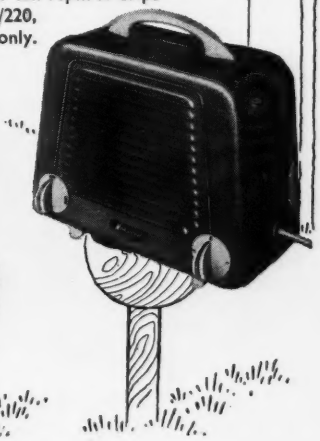
THE HOFFMANN MANUFACTURING CO. LTD., CHELMSFORD, ESSEX

SAM, the new Small Appliances Marketing Division of Kenwood means business — business for *you* the retailer of these three popular Kenwood products. Feature them in your display and see how quickly they make a hit with your customers.

Kenwood

STEAM-O-MATIC.
The tap water steam & dry iron.
Staybrite Stainless Steel inside and out and colourful plastic. Heats quickly, stays hot. *More* steam for longer ironing. Water can't spill or drip.
Voltages 100/110, 200/220, 230/250 AC only.

MINOR PORTABLE ELECTRIC MIXER. The efficient Kenwood food mixer to mix, beat or whip, quickly and thoroughly — anywhere in the kitchen. Voltages 100/125, 200/250, AC/DC.



ACTIVAIR.
Warmth where you need it.
The *fan* heater that gives extra heat when needed and cool air when wanted, with NINE different degrees of warmth at the touch of a switch, the cheap-to-run, tough, light Activair is handsomely styled in four gay attractive colours. Activair alone has the *unique* Air Fresher cell. Voltages 200/220, 230/250 (AC only)

Service · *Point of Sale & Display* · *Exhibitions* · *National Advertising*

Features which account for the milk in the coconut — and explain why Kenwood products are pre-eminent in the field of electric household appliances

MANUFACTURING CO. LTD. (*Small Appliances Marketing Division*) **Woking, Surrey**

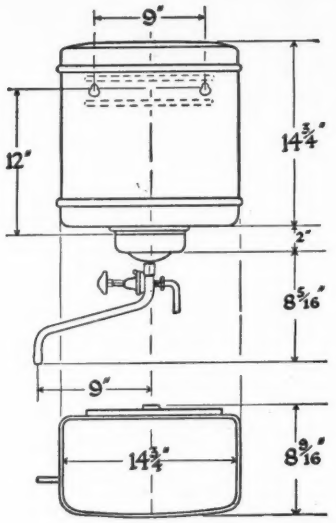
Reliability ***PLUS*** *Elegance in this . .*

New SANTON FLAT BACK Thermal Storage Heater

2 Gallon Capacity
Standard loading 1.2 kW (2 kW available).
All voltages 200/250 v. A.C.

Choice of Finish
Stove enamelled white or cream on a rustless body.

Choice of Colours
Contrasting coloured bands of either Silver, White, Red, Opaline Green, Light French Blue or Powder Blue.



PRICE £11-17-6
(PLUS £5-11-2 P.T.)

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ELECTRICAL APPLIANCES
& ALUMINIUM HOLLOWARE

The wide range of Swan Brand electrical appliances meets the needs of customers all the world over.
Made with traditional Swan Brand quality to give a lifetime's service and beautifully finished for extra sales appeal.

In the home for a LIFETIME

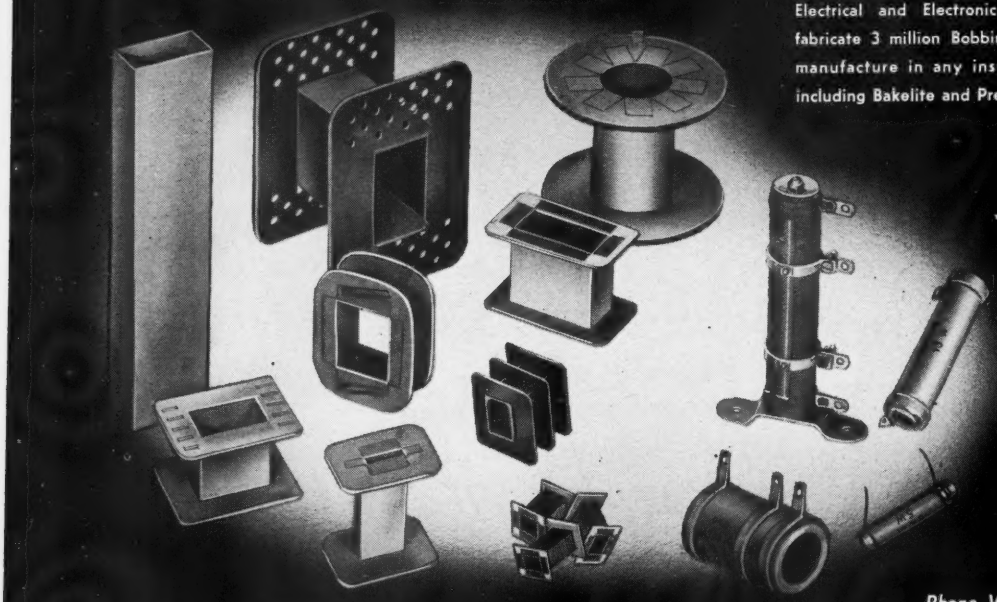
BULPITT & SONS LTD., ST. GEORGE'S WORKS, ICKNIELD STREET, BIRMINGHAM 18, ENGLAND

M-W.360R

Specialists in insulating **FORMERS, BOBBINS,** *and wire wound* **RESISTORS**

25 Years experience of manufacturing Bobbins and Formers enables us to satisfy the most exacting requirements of the Electrical and Electronic Industries. We fabricate 3 million Bobbins each year and manufacture in any insulating materials including Bakelite and Presspahn.

TRADE TUSKITE MARK
A.I.D APPROVED

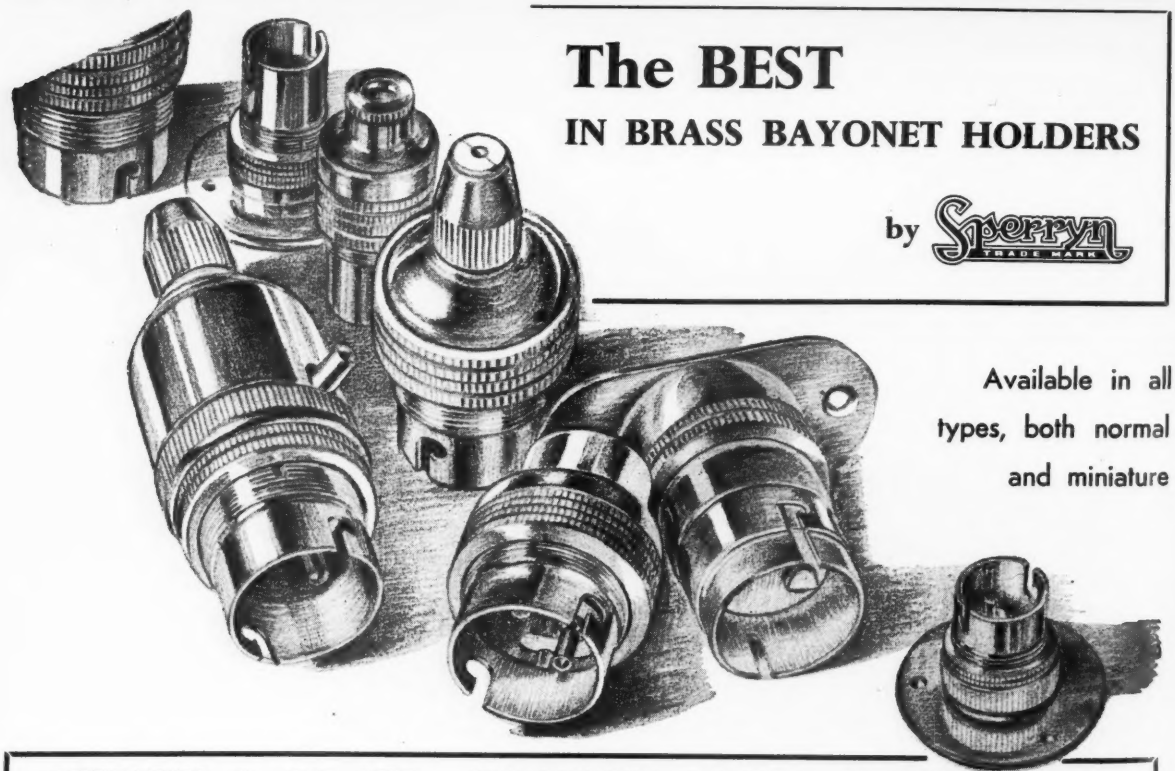


Phone VANGE 2167/8

ARMAND TAYLOR & CO. LTD. TUSKITE WORKS, MARSH ROAD, PITSEA, ESSEX.

The BEST
IN BRASS BAYONET HOLDERS

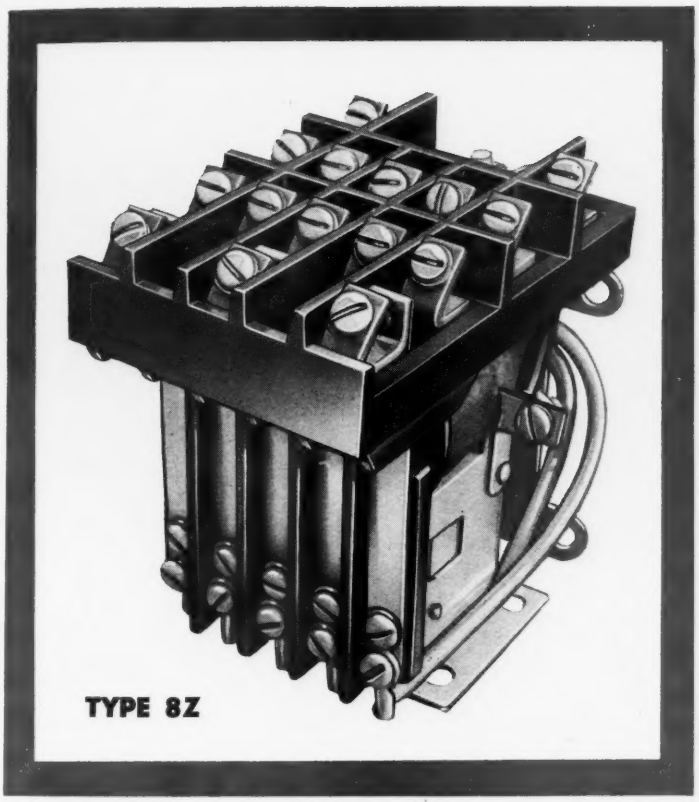
by Sperryn TRADE MARK



Available in all types, both normal and miniature

SPERRYN & CO. LTD., MOORSOM STREET, BIRMINGHAM 6

This is really quite a relay . . . .



Suitable for frequent duty, this general purpose relay has passed a life test of 5 million operations at a rate of 150 operations per minute.

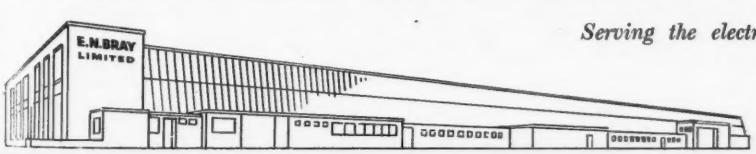
5 blades and up to 5 normally open and 3 normally closed contacts can be fitted, allowing 36 standard contact combinations. D.C. or A.C. versions are available. The contact rating on A.C. is 5 amps on a normally open contact and 2 amps on a normally closed contact. On D.C. the normally open contacts are rated at 200 watts and the normally closed at 50 watts. Dimensions are $2\frac{1}{8}$″ wide, $3\frac{1}{2}$″ high, $3\frac{1}{4}$″ deep.

You might call this one of our standard items—and very good it is too. But at E. N. Bray we tend to go in for the out of the ordinary jobs and whilst we shall be delighted to supply you with relays, contactors, starters, and so on from stock or at a reasonable delivery, we shall be no less happy to design and build equipment to meet your own special needs.

E. N. BRAY LIMITED

Control Gear Works, Britannia Road, Waltham Cross, Herts. Telephone: Waltham Cross 2212/3/4/5

Serving the electrical industry for more than 30 *years*



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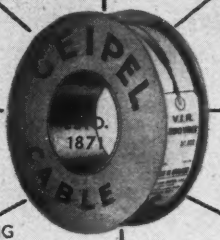

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MADE AND TESTED TO BRITISH STANDARD SPECIFICATIONS

WILLIAM GEIPEL LTD.
HEAD OFFICE: 156-170 BERMONDSEY ST · LONDON · S.E.1
CABLE WORKS, WEMBLEY

PERFORATIONS

IN ALL METALS AND MATERIALS FOR ALL TRADES INCLUDING ELECTRICAL, HEATING, VENTILATING, ETC.

W. BARNS & SON (HOLLOWAY) LTD.
Successors to W. BARNS & SON - Established 1860
GLOBE WORKS, QUEENSLAND ROAD, HOLLOWAY, LONDON, N.7.
Telephone: NORTH 3347-8
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Write for this Handbook

giving full technical information on the "Tophet" range of Stainless Steel Wires which we draw as fine as ·0005".

TOPHET

STAINLESS STEEL WIRES

Manufactured by **GILBY-BRUNTON LIMITED**
HEAD OFFICE & WORKS: SEAMILL, MUSSELBURGH, SCOTLAND
Telephone: Musselburgh 2369
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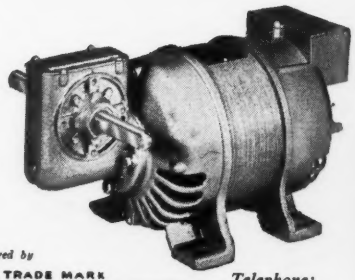
We specialise in FHP Motors

Including Universal, Permanent Capacitor, Induction, Synchronous, Shaded Pole and Split Phase types. These motors are available with Single or Double Reduction Worm Gear Boxes, with a range of speeds from ¼ r.p.m. up to 840 r.p.m. Our latest catalogue available on request. Also ask for details of our sewing machine motors—prompt deliveries.

Illustration shows Parvalux S.D.19 Single Reduction Worm Gear Unit with Split Phase Induction motor. 1/8 h.p. with a range of final speeds from 20 to 690 r.p.m.



Designed and Manufactured by
REGD. TRADE MARK
PARVALUX
LIMITED

Telephone: Parkstone 3827 PBX
Telegrams: Parvalux, Parkstone

PARKSTONE · POOLE · DORSET · ENGLAND
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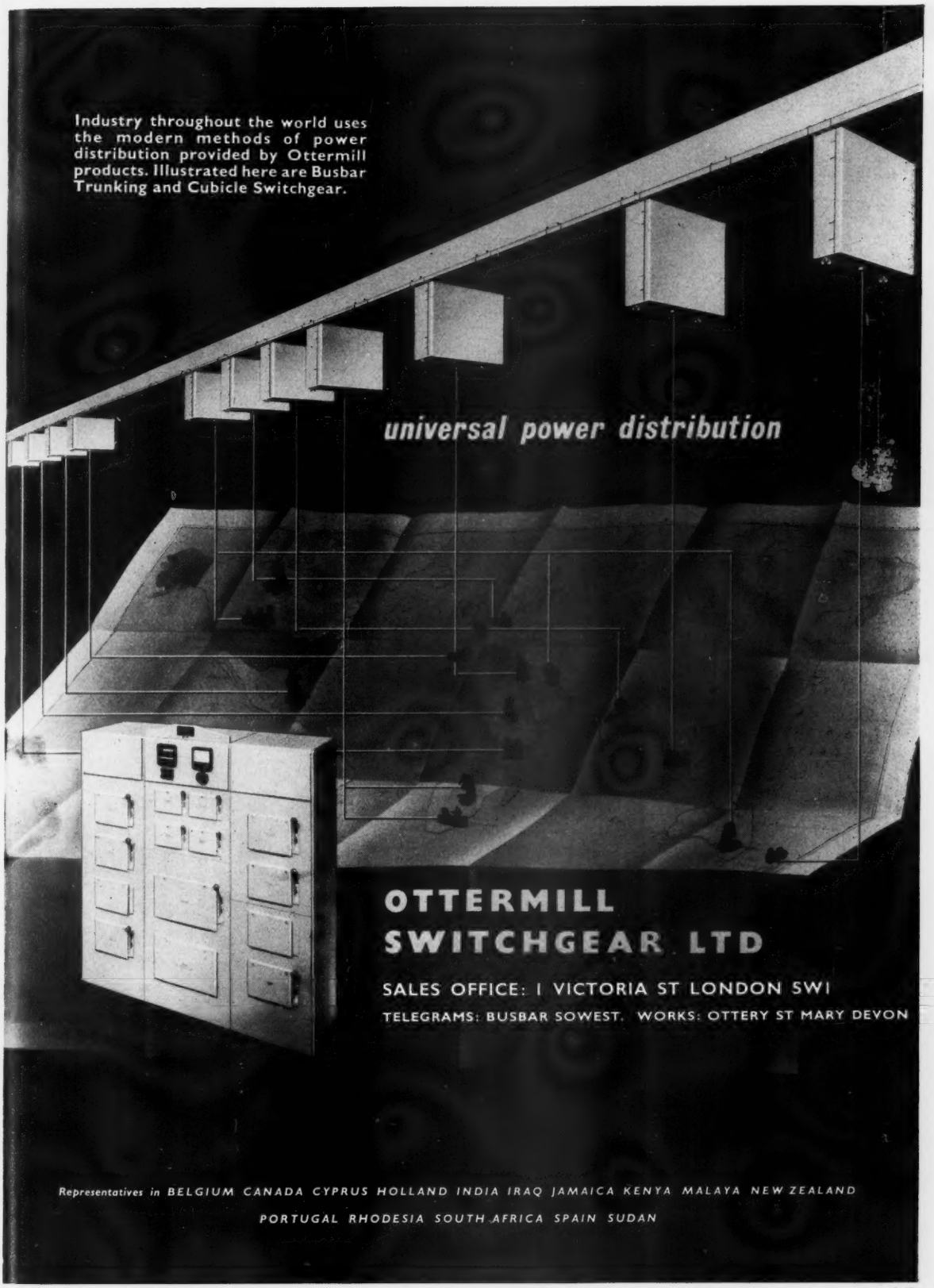
Industry throughout the world uses the modern methods of power distribution provided by Ottermill products. Illustrated here are Busbar Trunking and Cubicle Switchgear.
universal power distribution
OTTERMILL
SWITCHGEAR LTD
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TELEGRAMS: BUSBAR SOWEST. WORKS: OTTERY ST MARY DEVON
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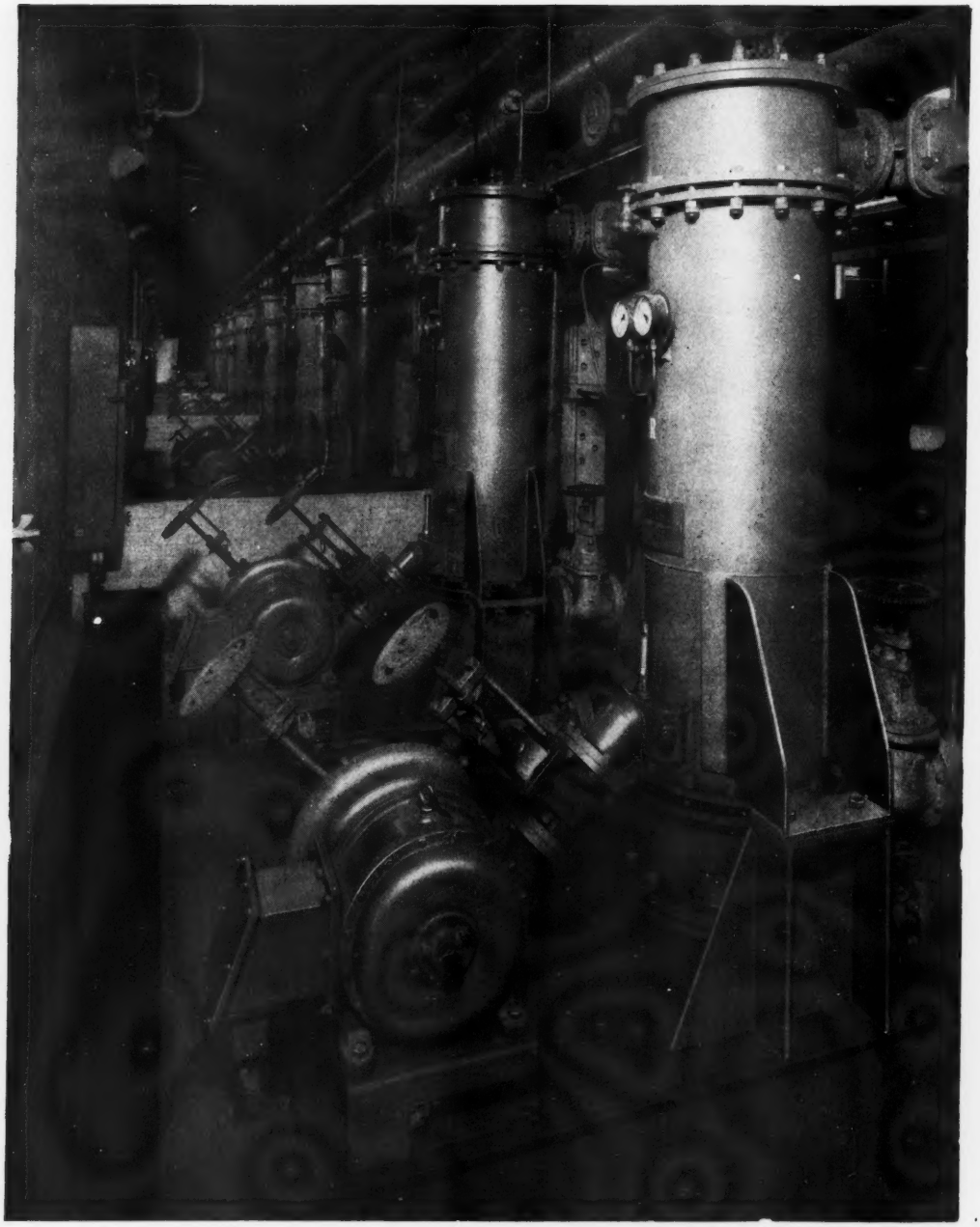


Verity motors installed at Bankside Power Station

"MADE BY VERITYS IS YOUR GUARANTEE"

VERITYS MANUFACTURE—A.C. and D.C. MOTORS, GENERATORS—CONTROL GEAR, Hand and Automatic Contactor Type—FANS—MAXLUME LIGHTING FITTINGS

VERITYS LTD.

Sales Headquarters: PLUME STREET, ASTON, BIRMINGHAM 6

Branches: BIRMINGHAM · BRISTOL · GLASGOW · LEEDS · LIVERPOOL
MANCHESTER · NEWCASTLE · LONDON

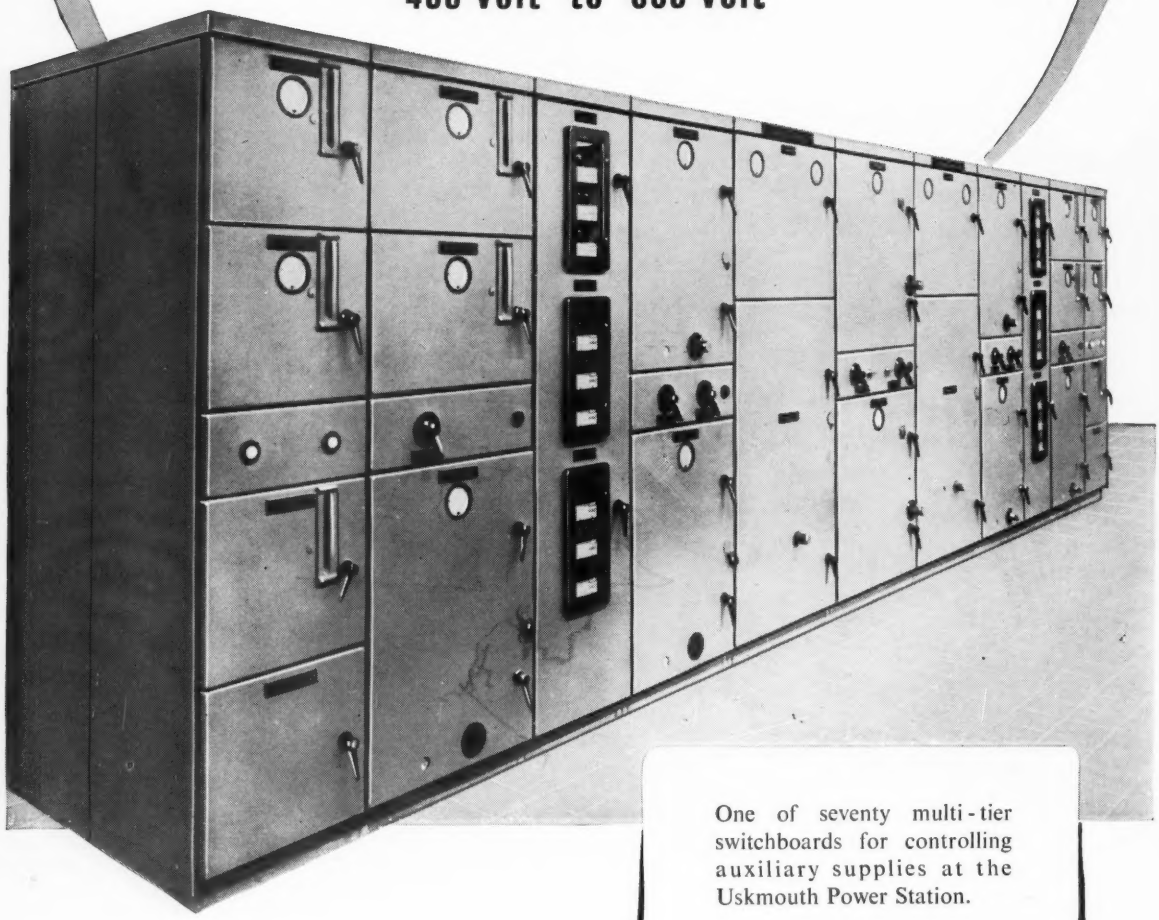
RISTS
DON'T TRUST TO LUCK ...
ORDER RISTS
Manufacturers of cables for aircraft, automobiles, shipping, house or factory wiring and for all industrial uses.

RISTS WIRES & CABLES LTD
LOWER MILEHOUSE LANE • NEWCASTLE-UNDER-LYME • STAFFS

G.E.C.

AIRBREAK SWITCHGEAR

15 MVA to 30 MVA
400 Volt to 660 Volt



One of seventy multi-tier switchboards for controlling auxiliary supplies at the Uskmouth Power Station.

Full particulars given in Technical Description No. 405.

THE GENERAL ELECTRIC COMPANY LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

VERTICAL ELECTRIC PUMP

Type A.I.E.

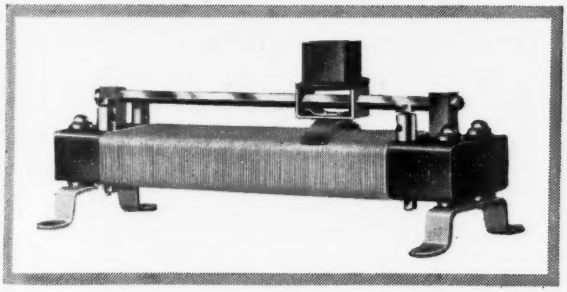
This ELECTRIC PUMP for shallow wells has a capacity of 100–300 G.P.H. to a total head of 90–200 ft., with a maximum suction lift of 25 ft. Totally enclosed self-oiling mechanism with BALL BEARINGS throughout. Low speed of 300 R.P.M.

Comprehensive range of Pumps available — write for details stating requirements to SOLE MANUFACTURERS—

H. J. GODWIN
LIMITED
QUENINGTON
GLOS.
Phone: COLNST. ALDWYNS 271 (6 lines)
Grams: Pumps, Quenington

GODWIN *Pumps*

SLIDING RHEOSTATS



SOUND IN DESIGN and incorporating a very high standard of craftsmanship at competitive prices, Cressall Sliding Rheostats are manufactured in a variety of types and sizes for every known requirement. They are also supplied with screw motion drive, bevel wheel drive and motor drive.

made by

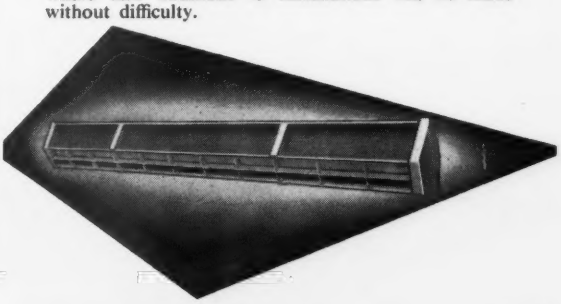
Cressall

THE CRESSALL MANUFACTURING COMPANY LIMITED
(A subsidiary of the Expanded Metal Company Limited)
ECLIPSE WORKS · TOWER STREET · BIRMINGHAM 19. Tel. Aston Cross 2666
London Office: BURWOOD HOUSE · CAXTON STREET · S.W.1. Tel.: ABBey 7766

SMITHLITE

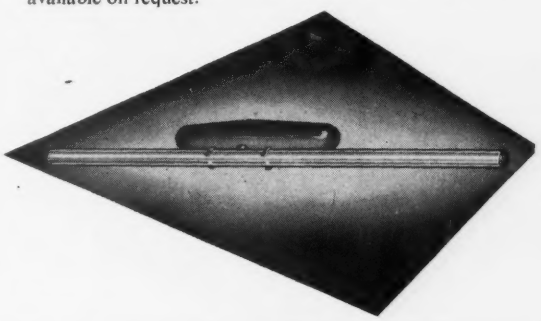
CABLE TRUNKING

Fabricated from rustproof steel stove enamelled or galvanised steel, self colour, in 16, 18 and 20 S.W.G. according to size. Available in 6 feet and 10 feet lengths for early delivery.
This trunking can be dismantled and used again elsewhere and additions to installations can be made without difficulty.



FLUORESCENT FITTINGS

Suitable for offices, showrooms, etc. Manufactured in a wide range to almost every need. All fittings are rust proof and stove enamelled. Totally enclosed control gear is fitted as standard.
Catalogues giving full details of the complete range are available on request.



CONTEMPORARY BATTENS

(Incorporating the SMITHLITE centre contact lamp) suitable for all lamps 5 feet to 2 feet. Available in Red, Blue, Green, Yellow, Cream or White. The control gear is totally enclosed and the design reduces metal work to a minimum.
Fully illustrated leaflets and prices obtainable on request.

HERMAN SMITH SMITHLITE LTD

EMPIRE WORKS · DUDLEY · WORCS.
TELEPHONE: DUDLEY 3178 3 LINES
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SMOKE

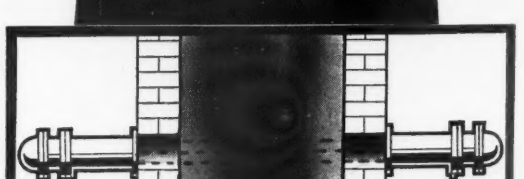
A MATTER OF URGENCY FOR EVERYONE

CHECK YOUR SMOKE EMISSION *IMMEDIATELY ACCURATELY* with the G.E.C. PHOTOELECTRIC SMOKE DENSITY MONITOR

The G.E.C. Photoelectric Smoke Density Monitor has been designed, in the interest of smoke abatement, to monitor the density of smoke in a stack. A light beam is projected across the stack. Visual and audible alarm systems operate whenever the density exceeds a pre-set level, the event being recorded. The circuit is designed so that, wherever possible, failures of components set the warning relay to the alarm position.

- *Constructed to comply with BS 2740/1956.*
- *Suitable for spans of 1 ft. to 10 ft.*
- *All enclosures are weatherproof and of cast construction.*
- *Stabilised power supply to projector and receiver.*
- *Projector intensity is electrically adjustable for varying operational conditions.*
- *Calibration by means of one simple adjustment.*
- *Provision for an air flow over the glass slides reduces deposits of soot thus minimising manual cleaning.*

For further details, please write for Publication OV 3865



THE GENERAL ELECTRIC CO LTD · MAGNET HOUSE · KINGSWAY · LONDON · WC2

Classified Advertisements

CLASSIFIED advertisements are PREPAID at 3/6 per line (approx. 6 words) per insertion. Where an advertisement includes a Box Number there is an additional charge of 1/-.

DISPLAYED CLASSIFIED:—48/- per inch. Cheques and Postal Orders should be crossed and made payable to ELECTRICAL REVIEW PUBLICATIONS LTD.

SERIES DISCOUNTS for consecutive insertions:—13, 5%; 26, 10%; 52, 15%.

SITUATIONS WANTED:—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1, but if not to be delivered to any particular firm or individual they should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Replies in such cases cannot be returned. The name of an advertiser using a Box Number will not be disclosed.

ADVERTISEMENTS are accepted up to **First Post on Monday** of the week of issue and should be addressed to ELECTRICAL REVIEW, Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.

Original testimonials should not be sent with applications for employment

9th AUGUST ISSUE

Classified Advertisements for the above issue are accepted up to FIRST POST on FRIDAY, 2nd AUGUST

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF SOUTHEND-ON-SEA

Proposed Electrical Installation

TENDERS are invited for the performance of works in connection with the proposed Electrical Installation and works incidental thereto at:

RICHMOND AVENUE
JUNIOR MIXED SCHOOL.

General conditions of contract may be inspected and copies of forms of tender, specification and drawings obtained on application to the Borough Architect, 30, Alexandra Street, on payment of a deposit of £2, which will be refunded on receipt of a bona fide tender or the return of all loaned documents.

Sealed tenders, addressed to the undersigned and endorsed "Electrical Installation, Richmond Avenue," are to be delivered to this office before 3 p.m. on Friday, 9th August, 1957, and no tender received thereafter will be considered.

No tender will be received except in the special envelope provided, which shall not bear any name or mark indicating the sender.

The Corporation do not bind themselves to accept the lowest or any tender.

ARCHIBALD GLEN,
Town Clerk. 6822

COUNTY BOROUGH OF IPSWICH

Fluorescent Street Lighting, 1957/1958

TENDERS are invited for the supply and erection of approximately 16 Group A Fluorescent Lanterns, with brackets, gear, etc., together with the erection of approximately 6 Group A steel columns in connection with the above scheme.

Conditions of contract may be seen and the specification and bill of quantities may be obtained from the Borough Engineer and Surveyor, 19, Tower Street, Ipswich, on payment of a deposit of £1 1s., which will be returned upon receipt of a bona fide tender.

Tenders, in plain sealed envelopes endorsed "Fluorescent Street Lighting, 1957/1958," must be received by the undersigned not later than noon on Monday, 19th August, 1957.

J. C. NELSON,
Town Clerk.
Town Hall,
Ipswich. 6842

BOROUGH OF CHELMSFORD

Provision and Erection of Group "A" Street Lamps

TENDERS are invited for the provision and erection of 34 Group "A" Street Lamps. A copy of the specification and form of tender may be obtained from the Borough Engineer and Surveyor, Chelmsford, upon payment of a deposit of two guineas, which will be refunded upon receipt of a bona fide tender not subsequently withdrawn. Drawings and the general conditions of contract may be inspected at the Borough Engineer and Surveyor's office during normal office hours.

Tenders in the envelopes provided must reach me not later than noon on Wednesday, 21st August, 1957.

B. A. FRANCIS,
Town Clerk.
Municipal Offices,
Duke Street,
Chelmsford. 6824

METROPOLITAN BOROUGH OF LEWISHAM

Main Street Sodium Vapour Lighting

TENDERS are invited for the following:—

(1) Supply of 101 Group A steel columns.
(2) Supply of 199 lanterns and control gear.
(3) Supply of 197 140-watt and 2 45-watt lamps.
(4) Work of erection, resiting and conversion.

Further particulars and forms of tender obtainable from Borough Engineer, Lewisham Town Hall, Catford, London, S.E.6. (Please state items in which interested.)

Closing date for receipt of tenders, 10 a.m. Monday, 19th August, 1957.

ALAN MILNER SMITH,
Town Clerk.
19th July, 1957. 6841

COUNTY BOROUGH OF WOLVERHAMPTON

Street Lighting Improvements, Group "A" Roads

TENDERS are invited for the installation of Sodium Class "A" Lighting, including the supply and erection of columns, lanterns, auxiliary control gear and time switches.

Plans and general conditions of contract may be inspected, and specifications, bills of quantities and form of tender may be obtained, on application to the Borough Engineer, Town Hall, Wolverhampton, on payment of a deposit of two guineas, returnable on receipt of a bona fide tender and all documents.

Tenders, enclosed in the official envelope provided, and endorsed "Street Lighting," must be delivered to the Town Clerk, Town Hall, Wolverhampton, by Monday, 19th August, 1957. 6825

ASHFORD (KENT) URBAN DISTRICT COUNCIL

Street Lighting, Class A

TENDERS are invited for the installation of 7 Steel Columns and Mercury Vapour Discharge Lamps.

Documents may be obtained from the Surveyor, 1 Elwick Road, Ashford, Kent, and returned to the undersigned by noon on 19th August, 1957.

J. SUDLOW,
Clerk of the Council.
Council Offices,
Church Road, Ashford, Kent.
18th July, 1957. 6839

COUNTY BOROUGH OF SUNDERLAND

Farringdon Secondary Modern School
Broadway Secondary Modern School

TENDERS are invited for the electrical installations at the above-named schools. Tender documents may be obtained from the Borough Architect, Grange House, Stockton Road, Sunderland, on payment of a deposit of two guineas (cheques to be made payable to "Sunderland Corporation"), returnable on receipt of bona fide tenders.

Sealed tenders, to be returned in the envelopes provided, must be delivered to my office not later than Thursday, 15th August, 1957.

G. S. McINTIRE,
Town Clerk. 6840

CITY OF DUNDEE

THE Corporation of Dundee (Police and Lighting Committee) invite offers for the supply of Concrete Columns, Lanterns, Sodium Lamps and Auxiliary Gear, New Lighting—Kingsway East Trunk Road, A.972.

Specification and form of tender may be obtained on application to the Public Lighting Engineer, 46, Dens Road, Dundee.

Sealed offers endorsed "Public Lighting Department — Concrete Columns, Lanterns, Lamps and Auxiliary Gear," to be lodged with the subscriber on or before 3rd August, 1957.

ROBERT LYLE,
Town Clerk.
City Chambers,
Dundee. 6823

SITUATIONS VACANT

SENIOR SCIENTIFIC OFFICERS SCIENTIFIC OFFICERS

THE CIVIL SERVICE COMMISSIONERS invite applications for pensionable appointments covering a wide range of scientific research and development in most of the major fields of fundamental and applied science. In biological subjects the number of vacancies is small; individual vacancies exist in the Natural History Museum for candidates who have special knowledge of, or who are interested in, crystallography, taxonomic entomology, palaeobotany, malacology, acarology.

Scientific officers are urgently required for the forensic science laboratories; for scientific examination of document and handwriting cases at Cardiff; for chemists at Preston, Harrogate and in London. There is also a vacancy for a senior scientific officer (biologist) at Harrogate.

The Royal Naval Scientific Service require a scientific officer (male) for the National Institute of Oceanography to work on oceanic cephalopoda.

Candidates must have obtained a University degree with first or second class honours in an appropriate scientific subject (including engineering) or in mathematics, or an equivalent qualification, or be otherwise qualified by high professional attainments. Candidates for senior scientific officer posts must in addition have had at least three years' post-graduate or other approved experience.

Age limits: Senior scientific officers, between 26 and 31, but specially suitable candidates under 26 may be admitted; for scientific officers between 21 and 28 during 1957 (up to 31 for permanent members of the experimental officer class). Salary (London) senior scientific officers: minimum £1,135 (women £1,047). Men's scale maximum £1,345. Scientific officers: minimum £605. Men's scale maximum £1,055. Women's pay above £605 slightly lower but being raised to reach equality with men's in 1961. Somewhat lower rates in the provinces. 5-day week, generally.

Further particulars from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting No. S.53/57 for senior scientific officers and S.52/57 for scientific officers.

Interview boards will sit at intervals, as required. Early application is advised. 6848

***Situations Vacant** (continued)*

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT DISTRICT ENGINEER, Medway District.

Salary £790 - £835 under N.J.B. Class F, Grade 9. Superannuable. Applicants should have had a good general education and be technically trained up to Higher National Certificate standard, and must have had practical training and experience in general distribution work on systems up to 11 kV.

Applications, naming two referees, to Ramsden Mellor, Esq., M.I.E.E., A.I.Mech.E., District Manager, SEEBOARD, Gardiner Street, Gillingham, Kent, by 7th August, 1957.

SENIOR SALES REPRESENTATIVE, Sevenoaks and Reigate District.

Salary £600 × £20 to £660 p.a. under N.J.C. 2. Superannuable. The person appointed will be required to give advice on supply matters, tariffs, appliance sales and electrical installations for all classes of domestic and commercial consumers. Applicants should be thoroughly conversant with all types of electrical appliances and installations, and in addition to acting as an outside representative must be prepared to carry out general showroom duties in any showroom within the Sevenoaks and Reigate District. Ability to drive a car is necessary.

Applications, naming two referees, on forms from H. F. Gill, District Manager, SEEBOARD, Electric House, West Hill, Oxted, by 7th August, 1957.

DEMONSTRATOR, Sevenoaks and Reigate District.

Salary £490 × £20 to £590 under N.J.C. Grade 1. Superannuable. Preference to applicants possessing a recognised diploma or certificate in domestic science and the E.A.W. Certificate. The person appointed will be required to conduct lectures and demonstrations, advise consumers and generally assist in the showroom. The appointment is primarily for Redhill showroom, but the successful applicant must be prepared to work in any of the Sevenoaks and Reigate District showrooms. Ability to drive a car is necessary.

Applications, naming two referees, on forms from H. F. Gill, District Manager, SEEBOARD, Electric House, West Hill, Oxted, by 7th August, 1957.

ASSISTANT DISTRICT ENGINEERS within the Surrey Sub-Area :

N.J.B. Class F, Grade 7.

Dorking and Epsom District ...	2
Sutton District	1

Salary £885 × £15 to £930 per annum plus, in the case of the Sutton appointment, London allowance. Superannuable.

Applicants should be Corporate Members of the Institution of Electrical Engineers or hold a Higher National Certificate in Electrical Engineering, and in addition should have had training and experience in the planning, construction, operation and maintenance of underground and overhead distribution systems, preferably up to 33 kV.

N.J.B. Class F, Grade 9.

Sutton District	1
Woking District	1

Salary £790 × £15 to £35 per annum plus, in the case of the Sutton appointment, London allowance. Superannuable.

Applicants of good general education should be technically trained up to Higher National Certificate standard, with practical experience of distribution work on H.V. and L.V. systems. Ability to plan and prepare schemes for mains extensions would be an advantage.

N.J.B. Class F, Grade 11.

Dorking and Epsom District ...	1
Sutton District	1

Salary £685 × £15 to £730 per annum plus, in the case of the Sutton appointment, London allowance. Superannuable.

Applicants, preferably of at least Higher National Certificate standard, should have had a sound training and experience in the construction, operation and maintenance of underground and overhead distribution systems.

Applications, naming two referees, on forms from C. W. Hughes, B.Sc., M.I.E.E., Surrey Manager, SEEBOARD, Rough Rew, Ridgeway Road, Dorking, Surrey, by 7th August, 1957.

GENERAL ASSISTANT ENGINEER, Sevenoaks and Reigate District.

Commencing salary £685 to £790 p.a. under N.J.B. Agreement, Class F, Grades 11 to 9, according to qualifications, experience and ability. Superannuable. Applicants should be suitably qualified and have had training and experience in the construction, operation and maintenance of underground and overhead distribution systems, preferably up to 33 kV. The position entails standby duties. The successful applicant will operate from District Office, Oxted, and his duties will cover any point within the District's area.

Applications, naming two referees, to H. F. Gill, District Manager, SEEBOARD, Electric House, West Hill, Oxted, by 7th August, 1957.

THIRD ASSISTANT DISTRICT ENGINEER, Croydon and Purley District.

Salary £885 × £15 to £930 p.a. under N.J.B. Schedule, Class H, Grade 9, plus London weighting. Applicants should be qualified engineers with experience of planning, construction and maintenance of underground and overhead systems, preferably up to 33 kV. The person appointed will be required to undertake standby duties.

Applications, naming two referees, to H. Lowe, M.I.E.E., District Manager, SEEBOARD, Electric House, Wellesley Road, Croydon, by 7th August, 1957.

ASSISTANT DISTRICT ENGINEER, Folkestone and Ashford District.

Salary £885 × £15 to £930 under N.J.B. Class F, Grade 7, superannuable. Applicants, who should have had a good general education and be technically trained up to Higher National Certificate standard, must have had practical training and experience in the operation, maintenance and construction of medium-voltage and E.H.V. distribution, underground and overhead, up to and including 11 kV.

Applications, naming two referees, to D. B. R. Roberts, A.I.E.E., Folkestone and Ashford Manager, SEEBOARD, York House, Cheriton Gardens, Folkestone, Kent, by 7th August, 1957.

ENGINEERING DRAUGHTSMAN, Engineer-in-Chief's Department, Headquarters.

Salary under N.J.B. Grade D.4, £895 × £20 to £995. Superannuable. Applicants, of good general education, supported by adequate technical knowledge in electrical or mechanical engineering, must be competent draughtsmen and should have had experience in the layout and constructional details of large indoor and outdoor substations up to 33 kV with associated cable works and overhead lines. Works experience with a manufacturer of heavy electrical equipment is desirable.

Applications, naming two referees, on forms from Engineer-in-Chief, SEEBOARD, 10, Queen's Gardens, Hove, 3, Sussex, by 7th August, 1957.

A. L. BURNELL,
Secretary. 6853

AIR MINISTRY

ASSISTANT MECHANICAL AND ELECTRICAL ENGINEERS required in Works Department for design, operation and maintenance of mechanical and electrical services on R.A.F. stations at home and overseas and Civil Aviation stations.

Salary according to age ; £765 at 25 up to £1,030 at 34 or over, thereafter rising to maximum £1,190 London appointment ; somewhat lower in Provinces. Promotion prospects. Appointments non-pensionable but with pensionable prospects. 5-day week with 4-6 weeks' leave a year according to length of service. Special allowance up to £1,450 a year, according to location, payable in addition to salary during overseas service.

Candidates normally must be natural-born British subjects of natural-born British parents and age 25 or over. Minimum qualifications and experience : (i) (a) University degree or equivalent diploma in electrical and/or mechanical engineering with at least 2 years' apprenticeship ; or (b) Graduate or Corporate Member of I.E.E. with at least 3 years' apprenticeship ; or (c) Graduate or Corporate Member of I.Mech.E., appreciable electrical engineering experience, with at least 3 years' apprenticeship, and (ii) have been employed for minimum of three years with well-established engineering concern and gained wide experience in both electrical and mechanical engineering practice.

Forms, quoting reference D.306/6A, from M.L.N.S., Technical and Scientific Register (K), 26, King Street, London, S.W.1. 259

YORKSHIRE ELECTRICITY BOARD

No. 2 (Huddersfield) Sub-Area

THIRD ASSISTANT ENGINEER (System Design).

Applicants should be Graduate Members of the Institution of Electrical Engineers or hold equivalent qualifications and have had experience in planning extensions of distribution systems operating at 11 kV and below, together with the preparation of the relevant technical reports and estimates. They must also have had practical experience of the construction, operation and maintenance of H.V. and L.V. distribution systems.

Salary N.J.B. Class K, Grade 10, £935/£20/£995 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than 9th August, 1957.

No. 7 (Grimsby) Sub-Area

GRIMSBY DISTRICT
SECOND ASSISTANT DISTRICT ENGINEER.

Applicants should preferably be Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications. They should have had a sound training and extensive experience in the design, construction, operation and maintenance of H.V. and L.V. underground and overhead distribution systems, substation plant and ancillary equipment in both urban and rural areas.

Salary N.J.B. Class F, Grade 7, £885/£15/£930 per annum.

SCUNTHORPE DISTRICT, 1 post
GAINSBOROUGH DISTRICT, 1 post
SURVEYOR.

Applicants should have sound practical experience in the surveying and routing of H.V. and L.V. overhead lines and in the preparation of profile drawings and schedules of materials for construction work.

Salary N.J.B. Schedule D, Grade 6, £595/£20/£715 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than 9th August, 1957.

No. 1 (Bradford) Sub-Area

KEIGHLEY DISTRICT
THIRD ASSISTANT DISTRICT ENGINEER.

Applicants should have passed the Associate Membership Examination of the Institution of Electrical Engineers, or hold equivalent qualifications, and have experience in construction, operation and maintenance of high voltage systems, underground cables and overhead lines and substations, and medium low voltage networks.

Candidates should be prepared to reside within the district and undertake standby duties.

Salary N.J.B. Class F, Grade 9, £790/£15/£835 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45/53, Sunbridge Road, Bradford, not later than 9th August, 1957. 6849

COUNTY OF LEICESTER

Coalville Mining and Technical College
(Principal : W. A. Burrows, B.Sc.)

APPLICATIONS are invited for the following posts :—

ASSISTANT GRADE B (Electrical Engineering) and

ASSISTANT GRADE B (Mechanical Engineering).

Applicants should hold a degree or H.N.C. in Electrical or Mechanical Engineering. Mining experience desirable. Salary £650 × £25 to £1,025 plus appropriate allowances for degrees, training and industrial experience.

Applications (no forms) stating age, qualifications, education, teaching and industrial experience, together with copies of two recent testimonials, and the names of three referees, should be sent to the Principal by 2nd August, 1957. 6789

CENTRAL ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division :—

SHIFT CHARGE ENGINEER, BURTON-ON-TRENT POWER STATION (Vacancy No. 91/57/ER).

Sound technical training and practical experience in the control and operation of steam generating plant and main switchgear are required. Appropriate qualifications an advantage.

Salary in accordance with Class E, Grade 7 (£835-£880 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

ASSISTANT, INTERNAL AUDIT, DIVISIONAL ACCOUNTANT'S DEPT., DIVISIONAL HEADQUARTERS (Vacancy No. 120/57/ER).

The position will be based at Nottingham, but will involve a substantial amount of travel within the Division's area.

Salary in accordance with Grade 3 (£660-£720 per annum) of the National Joint Council Agreement.

Applicants should have some experience of professional auditing or of internal audit work in a large organisation. Progress towards obtaining a recognised accountancy qualification will be an advantage.

Closing date for receipt of applications, 2nd August, 1957.

THIRD ASSISTANT ENGINEER (Mechanical), GENERATION (Construction) DEPT. (Vacancy No. 121/57/ER).

Applicants should have had a fundamental training in mechanical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of mechanical plant as installed in modern power stations. Preference will be given to candidates who possess a Degree or are Graduate Members of the Institution of Mechanical Engineers.

Salary will be within Class AX/EX, Grade 4 (£895-£1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

ASSISTANT MAINTENANCE ENGINEER (Electrical), STAYTHORPE POWER STATION (Vacancy No. 122/57/ER).

Applicants should have had a sound practical and technical training, and previous experience of power station electrical maintenance is desirable.

Preference will be given to engineers in possession of, or qualifications leading to, Corporate Membership of the Institution of Electrical Engineers.

Salary will be within Class K, Grade 8 (£1,065-£1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

FOURTH ASSISTANT ENGINEER, DRAKELOW TRANSMISSION SECTION OFFICE (Vacancy No. 123/57/ER).

The section contains extensive 275-kV and 132-kV equipment and the candidates must have had wide experience in the maintenance and operation of 132-kV lines and substations in a transmission section.

Preference will be given to candidates with qualifications leading to Corporate Membership of the Institution of Electrical Engineers.

Salary will be in accordance with Class AX/EX, Grade 6 (£710-£935 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

FOURTH ASSISTANT ENGINEER, COVENTRY TRANSMISSION SECTION OFFICE (Vacancy No. 124/57/ER).

Applicants should have experience of the maintenance and operation of high-voltage overhead lines, transformer and switchgear up to 132 kV.

Preference will be given to candidates with qualifications leading to Corporate Membership of the Institution of Electrical Engineers.

Salary will be in accordance with Class AX/EX, Grade 5 (£810-£1,035 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

ASSISTANT SHIFT CHARGE ENGINEER, COVENTRY POWER STATION (Vacancy No. 125/57/ER).

Applicants are required to take charge of shift operation of boiler house plant and must possess a sound technical training, a good general engineering experience, and knowledge of the control and operation of water tube boilers, ancillary plant and the efficient combustion of fuels on chain grate stokers.

Salary will be in accordance with Class G, Grade 9 (£835-£880 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8th August, 1957.

These appointments will be pensionable within the provisions of the Central Electricity Authority and Area Boards (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, Central Electricity Authority, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.

17th July, 1957. 6809

JOHNSON & PHILLIPS LTD.

require for their

SWITCHGEAR DEPARTMENT

ENGINEERS. Accustomed to dealing with contracts and projects for L.T. and H.T. switchgear up to 11 kV. Applicants must be capable of working on their own initiative and handling generation and distribution schemes.

DRAUGHTSMEN. Should have experience of contract and layout applicable to all types of H.T. and L.T. switchgear up to 11 kV.

CIRCUIT ENGINEERS. Applicants must have experience of preparing protective and control schemes for generation and distribution switchgear.

The company offers first-class conditions of service, superannuation scheme, facilities for canteen, sport, social activities, etc.

Interviews can be arranged for any time, including evenings and Saturdays.

Write, giving details of age, training and experience, to :—

Employment Manager,
JOHNSON & PHILLIPS LTD.
Victoria Way, Charlton,
London, S.E.7

6815

PUBLICITY ASSISTANT

BRUCE PEEBLES & Co. Ltd., Engineers, Edinburgh, require a man with experience in technical journalism and ability to write lucid descriptions of electrical engineering products and processes for publicity, press, and other purposes. The successful applicant will be required to assist with the writing and editing of a works magazine and should preferably have a good electrical engineering qualification.

Replies, stating full details of education, training, experience, age, present post and salary, to J. S. Baillie, Publicity Manager, at the above address. 6860

CONTROLLED THERMONUCLEAR REACTION PROJECT

at

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL

THIS project is to be expanded. The Establishment would welcome enquiries from Graduate and Postgraduate Research Physicists who wish to be considered for employment on this project. The following vacancies are immediately available :—

1. EXPERIMENTAL ENGINEERING.

A team of 6 experimental engineers is to be formed to study technological problems, including methods of electrical energy storage, high-voltage and high-current switching, etc.

These posts will be in the Scientific Officer and Experimental Officer classes. (Ref. 829Z/48.)

2. PROJECT DESIGN AND ENGINEERING SECTION.

(a) Senior Project Engineer (Engineer I), to take charge of project design team with responsibility for initial design of schemes in collaboration with scientific staff and for directing resulting engineering design, manufacture, construction and commissioning of plant to precise target dates. (Ref. 857Y/48.)

(b) Project Engineers (Engineers II and III), to be responsible for engineering of sections of the above work. (Ref. 859Y/48.)

3. ELECTRONIC INSTRUMENTATION.

Design and development of special electronic measuring instruments for the study of gas discharge phenomena and allied problems.

The post will be in the Scientific Officer Class. (Ref. 822Z/48.)

SALARY AND QUALIFICATIONS

SCIENTIFIC OFFICER Class :
Scale £610-£1,980.
Minimum qualifications, 1st or 2nd Class Honours Degree (Physics or Electrical Engineering).

EXPERIMENTAL OFFICER Class :
Scale £940-£1,550.
Minimum qualifications : H.N.C. in Electrical Engineering or equivalent.

ENGINEERING :
Eng. I, Scale £1,705-£1,980.
Eng. II, Scale £1,235-£1,655.
Minimum qualifications : Corporate Membership of Institutions of Electrical or Mechanical Engineers and preferably Engineering Degree.
Eng. III, Scale £775-£1,210.
Minimum qualifications: Graduate membership or exempting qualifications, with preferably engineering degree.

Housing, superannuation and other excellent conditions.

Send POSTCARD by 5th August, 1957, quoting appropriate reference, for further details and an application form, to :—

GROUP RECRUITMENT OFFICER,
A.E.R.E., HARWELL, DIDCOT, BERKS.

6778

ELECTRICITY CORPORATION OF NIGERIA

Instructor in Mechanical Engineering

QUALIFICATIONS and experience required :—

Preference will be given to candidates of the ex-C.E.R.A. type who have had a sound engineering training and wide practical experience on water tube boilers, steam turbines, diesel-engined generating plant and auxiliaries, and who subsequently have held a responsible position as a training instructor.

The essential qualities are even temperament, tact, and ability to demonstrate and explain the technicalities of plant maintenance and operation.

The selected candidate will be required to undertake the instruction and training of Nigerian apprentices up to the full technician grade under the direction of the Training and Education Officer.

Age limits 35-52 years ; two tours of 18-24 months each; salary £1,179 × £54 to £1,449 plus inducement allowance of £270-£300 per annum. A gratuity is payable, in addition, on completion of service.

Application, upon forms to be obtained from the Liaison Officer, The Electricity Corporation of Nigeria, 11, Manchester Square, London, W.1, must be returned completed not later than 30th July, 1957. 6790

Situations Vacant (continued)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments, all subject to the N.J.B. Agreement for the Electricity Supply Industry:

Tyne Sub-Area

THIRD ASSISTANT DISTRICT ENGINEER with location at Blyth District. Applicants should be qualified electrical engineers with sound practical training and experience in construction, operation and maintenance of overhead and underground networks and associated plant and equipment.

Salary Schedule A, Class E, Grade 9, £740/£785.

Tees Sub-Area

THIRD ASSISTANT ENGINEER, Planning and Development Section, Sub-Area Headqugarters.

Applicants should be qualified engineers with extensive experience in all classes of electrical engineering planning and development work.

Salary Schedule A, Class K, Grade 10, £935/£995.

SENIOR DRAUGHTSMAN, Drawing Office, Sub-Area Headquarters.

Applicants should be suitably qualified with wide structural experience in brick work, concrete and knowledge of civil work.

Salary Schedule D, Grade 5, £760/£860.

ENGINEERING DRAUGHTSMAN, Drawing Office, Sub-Area Headquarters.

Applicants should have had experience in design of brick buildings; some knowledge of layout of electrical equipment in substations an advantage.

Salary Schedule D, Grade 6, £595/£715.

Applications, stating age, qualifications and experience, to be received by the Secretary (Establishments), North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 6850

JOSEPH LUCAS (ELECTRICAL) LTD.

Great King Street, Birmingham

AS a result of expansion of our road vehicle lighting development department to meet the growing demands of the motor industry we have vacancies for

ENGINEERS AND PHYSICISTS

of at least H.N.C. standard to work on the following projects. Experience or knowledge of photometric and electrical instruments desirable.

The design and development of vehicle lighting equipment and in particular the development of optical systems for future projects.

Development work on specific problems related to vehicle lighting equipment and the design of laboratory and factory control equipment for these products.

In addition there are vacancies for SENIOR DESIGNERS required to work in close co-operation with car designers and styling engineers on the design of lighting equipment for new car models. Experience in the design of pressed metal components for large quantity production desirable.

All of these positions carry attractive starting salaries and provide excellent prospects for advancement. Staff pension fund.

Apply in writing, stating age, qualifications and experience, to the Personnel Manager, Joseph Lucas (Electrical) Limited, Great King Street, Birmingham, 19, quoting reference PM/D/156.

6831

ELECTRICAL ENGINEERS

are required in the Laboratories of Igranic Electric Co. Ltd., for work on a variety of projects in the control gear field.

Salary in accordance with qualifications and experience. Apply to—

Personnel Officer,
IGRANIC ELECTRIC CO. LTD.
Bedford 6812

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

Shropshire and Herefordshire Sub-Area

SECOND ASSISTANT ENGINEER (Operations and Maintenance Section). Duties include assisting the senior engineer in commissioning 11 kV, 33 kV and 66 kV substations and maintenance of switchgear, transformers, etc. Technical qualifications desirable. Salary per annum (£995/£1,055 (N.J.B. Grade H.7).

Apply by letter within fourteen days, stating age, qualifications, present position and salary, to Mr. W. Winwood, Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

Worcester and District Sub-Area

SERVICE CENTRE SUPERVISOR (Male) (Kidderminster Service Centre). Applicants must be experienced in the sale of domestic electrical apparatus. Salary £660/£720 per annum (N.J.C. Grade 3).

Apply by letter to District Manager, Midlands Electricity Board, New Road, Kidderminster.

A. STEPHENS,
Secretary.
6845

ESTIMATING ENGINEERS

Opportunities with

"ENGLISH ELECTRIC"

STAFFORD.

There are a variety of openings at Stafford for engineers interested in this work. These cover the fields of heavy fabrication and machining pre-cost, as well as estimating for comprehensive Control Gear Systems. There are opportunities here for qualified men as well as engineers with a practical heavy engineering background or a good knowledge of control systems as applied to distribution or use of electricity.

The question of assistance in the housing problem and with removal expenses can be discussed at interview (expenses paid).

Please write giving full details of experience to

Central Personnel Services,

336/7, Strand, London, W.C.2,

quoting

Reference ER.1294A.

6863

CENTRAL ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Conditions of service in accordance with N.J.C. Agreement, Schedule A. Salary includes London allowance. Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. for posts (a) and Corporate Membership for post (b) an advantage.

(a) ASSISTANT ENGINEER (Operation), BRUNSWICK WHARF POWER STATION (Vacancy No. 57/660).

Applicants should have experience of operational duties in boiler and turbine houses, also isolation of switchgear. Salary Class K, Grade 11 = £935 plus £88 10s. p.a. shift.

(a) ASSISTANT SHIFT CHARGE ENGINEER, FULHAM POWER STATION (Vacancy No. 57/661).

Applicants should have had sound engineering training followed by experience with large modern station plant. Salary Class K, Grade 9 = £1,045 plus £99 10s. p.a. shift.

(b) STATION SUPERINTENDENT, HAMMERSMITH AND BARNES POWER STATIONS (Vacancy No. 57/662).

Good record of labour relations and managerial ability, and sound practical experience of power station operation and maintenance essential. Salary Class E, Grade 1 = £1,285 plus £50 additional allowance p.a.

Applications, quoting vacancy number, may be made on form obtainable from Divisional Secretary, C.E.A., London Division, P.O. Box 136, Generation House, Great Portland Street, London, W.1, and be received within 10 days of this advertisement. 6808

MINISTRY OF LABOUR AND NATIONAL SERVICE

Electrical Inspector of Factories

THE CIVIL SERVICE COMMISSIONERS invite applications for two pensionable posts. Age at least 35 on 1st July, 1957. Duties involve administration of the Electricity (Factories Act) Special Regulations, 1908 and 1944, in factories. A sound knowledge of the general scheme and conditions of electricity supply in this country and of the products of electrical manufacturers is essential.

Candidates must have achieved Corporate Membership of the Institution of Electrical Engineers and have had several years' professional experience. Responsible experience in large electricity supply undertakings or electrical manufacturing works an advantage.

Salary scale (London) £1,315 (lower if under 37) to £1,950. Lower rates outside London and for women, but women's rates being raised to reach equality with men's by 1961.

Further particulars and application forms from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting No. S.4734/57. Application forms to be returned by 14th August, 1957. 6788

AUTOMATIC TEMPERATURE CONTROL

DESIGN & PROJECT ENGINEERS wanted for Technical Department of leading manufacturer of automatic temperature controls used for central heating, air conditioning, etc.

Design Engineers must have had experience in original design of small electro-mechanical devices either directly or indirectly associated with temperature control.

Project Engineers must have had experience in conversion of prototypes into production designs using latest production techniques.

Good salaries and pension schemes. Apply in writing stating training, experience and salary required to the Technical Superintendent, The Rheostatic Company Limited, Farnham Road, Slough, Bucks.

6704

CITY OF SALISBURY, SOUTHERN RHODESIA

Electricity Undertaking

Vacancies for Instrument Mechanics

APPLICATIONS are invited from suitably qualified persons for the following vacancies:—

(a) TEST ROOM INSTRUMENT MECHANICS.

Applicants must be capable of carrying out the repair, testing and calibration of all types of three phase and single phase meters, kVA and re-active kVA meters, high tension and low tension metering equipments with current transformers, and special bulk supply metering equipments. Experience in general test room work and the testing and calibration of indicating instruments and relays will be considered an advantage.

(b) POWER STATION INSTRUMENT MECHANICS.

Applicants must have had extensive experience in the calibration, repair and maintenance of instruments and control gear as used for steam power plant.

Wages are £21 12s. for a 48-hour week. No cost-of-living or other allowances are payable, and overtime is at prescribed rates.

The successful candidates must comply with the requirements of the Immigration Authorities and will be required to submit to the Council a satisfactory medical certificate of fitness.

Forms of application and further particulars regarding conditions of employment allowances towards travelling and removal expenses, etc., are obtainable from Davis & Soper Ltd., 52/54, St. Mary Axe, London, E.C.3, to whom applications should be submitted. 6847

IMPERIAL CHEMICAL INDUSTRIES LIMITED,

WILTON WORKS.

ENGINEERING DESIGNERS

who possess Higher National Certificate or its equivalent, and who have experience in the following branches of engineering:

MECHANICAL, CIVIL,
ELECTRICAL, STRUCTURAL,
ARCHITECTURAL,
HEATING AND VENTILATING,

are required to fill immediate vacancies in the Design Office. Over 4,700 men are at present employed on the design and construction of the works, which has its own power station.

Commencing salaries up to £900 per annum.

Profit sharing scheme and pension fund.

Housing: After joining the staff married men will receive a reasonable refund of removal (including travel) expenses and, to assist them in house purchase, facilities are available in approved cases for substantial loans. In addition legal charges will be advanced. A lodging allowance will be paid for a period to married men selected for these appointments whilst maintaining two homes.

The Design Offices are situated in the parklands of Wilton Castle, which lies at the foot of the Cleveland Hills.

Please write to me: Staff Manager, Imperial Chemical Industries Limited, Wilton Works, Middlesbrough, Yorkshire, quoting reference 404/6.

6686

BARROW IRONWORKS LIMITED

Barrow-in-Furness

ASSISTANT ELECTRICAL ENGINEER required with sound technical training and practical experience on maintenance, installation, generation and control equipments up to 6,600 v. A.C. On heavy plant as associated with blast furnaces.

The post is superannuable.

Reply, giving full details of education, training, etc., to Managing Director, Barrow Ironworks Limited, Barrow-in-Furness. 6766

CENTRAL ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following appointment in this Division:—

ASSISTANT SHIFT CHARGE ENGINEER, CASTLE DONINGTON POWER STATION
(Vacancy No. 132/57/ER).

Applications are required from suitably qualified engineers who have had sound experience in the operation of modern high-pressure generating plant.

The salary will be in accordance with Class L, Grade 9 (£1,065 - £1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 22nd August, 1957.

The position is pensionable within the terms and conditions of the C.E.A. and Area Boards (Staff) Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, Central Electricity Authority, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.

18th July, 1957. 6827

PROJECTS ENGINEER

SIMON-CARVES LTD.

have a vacancy in the Precipitator Division of their Chemical Plant Department for a

PROJECTS ENGINEER

for projects work on electrostatic precipitators.

Applicants should at least have an O.N.C. (Mechanical or Electrical) and must have had previous experience on mechanical or electrical projects work.

This post is permanent and pensionable, salary depending on qualifications and experience. Good working conditions.

Write, quoting Ref. KX.89, to Simon-Carves Ltd., Staff & Training Division, Cheadle Heath, Stockport.

6814

ELECTRICAL ENGINEER

required for experimental and test work connected with the design and development of ignition equipment for gas turbines. Applicants should have Higher National Certificate and some workshop experience. Ability to construct rough prototypes is desirable.

The position provides an interesting opportunity in a new and developing field with good prospects for advancement. Five-day week. Staff pension fund.

Apply in writing, stating age, qualifications and experience, to the Personnel Manager, Joseph Lucas (Electrical) Ltd., Great King Street, Birmingham, 19, quoting reference PM/D/166.

6830

DRAUGHTSMEN

DRAUGHTSMEN required for large electrical manufacturing company in South Africa. Experience of design, layout and detailing of electrical switchgear is desirable, but general experience on mechanisms and details is acceptable.

Some initial training may be necessary in this country before proceeding abroad.

All positions offer scope for advancement.

Apply stating age, qualifications, experience to—Box 6615.

EAST MIDLANDS ELECTRICITY BOARD

First Assistant District Engineer, Wellingborough District, Northamptonshire Sub-Area

APPLICATIONS are invited for the appointment of a FIRST ASSISTANT DISTRICT ENGINEER in the Wellingborough District of the Northamptonshire Sub-Area.

The salary and conditions for the appointment will be in accordance with the National Joint Board Agreement, Class E, Grade 5 (£935-£995 per annum).

Applicants should have had experience in the construction, maintenance and operation of H.V. and L.V. underground and overhead networks, and preference will be given to those having a technical qualification equivalent at least to the Higher National Certificate in Electrical Engineering.

The successful candidate, who must be able to drive a motor vehicle, will be required to undertake standby duty and to reside within the Wellingborough District.

Applications stating age, qualifications, experience and present position, should be forwarded to the Manager, Northamptonshire Sub-Area, 25, Bridge Street, Northampton, to reach him within 14 days of the date of this advertisement. 6856

THE HOTPOINT ELECTRIC APPLIANCE CO. LTD.

An A.E.I. Company

APPLICATIONS are invited for the position of SALES REPRESENTATIVE for the Newbury Area.

Experience in selling domestic electrical appliances to the trade would be an advantage but is not essential.

Applicants should not be over 30 years of age and must have outstanding personal qualities of character, energy and enthusiasm, together with a real interest in successful selling.

There are excellent prospects for subsequent promotion to senior executive position on the basis of individual merit and accomplishment.

A good salary will be paid, and there is a bonus plan, together with pension and other benefits. A car is provided.

Apply in confidence, giving full details of qualifications and experience to District Manager, The Hotpoint Electric Appliance Co. Ltd., 72, Oxford Road, Reading, Berks.

6861

ARTHUR GUINNESS SON & CO. (DUBLIN) LTD.

St. James's Gate Brewery, Dublin

have a vacancy for an

ELECTRICAL DRAUGHTSMAN.

An excellent opportunity for an enterprising man between 23 and 28 years of age, possessing Higher National Certificate or Part 2 of I.E.E. Examination or equivalent, with experience in lighting, power and electronic layouts in process industry.

The post is a progressive one with a commencing salary in the range £596 to £800 commensurate with qualifications and experience. Promotion to higher grades possible.

Non-contributory pension scheme.

Assistance in moving home.

Please write to the Chief Engineer, giving chronological particulars of education, technical training, apprenticeship and posts held.

For those selected for interview, all travelling expenses will be paid. Successful candidate must pass a medical examination of high standard. 6665

BRITISH KLOCKNER SWITCHGEAR LIMITED

Chertsey, Surrey

TECHNICAL SALES ENGINEERS required for London and Home Counties. Knowledge of motor control gear; sales experience preferred but not essential. Apply giving full particulars to—Managing Director. 166

Situations Vacant (continued)

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL

requires a WORKING CHARGEHAND to take charge of a small section engaged in the maintenance of electro-mechanical equipment, instruments and electronic units in a reactor maintenance section.

Applicants should be apprenticed craftsmen or have had equivalent acceptable training and be experienced in maintenance problems in the electrical field, instrument and control circuitry. It may be an advantage for applicants to possess Ordinary National or City and Guilds Certificates or to have experience in the service as an E.R.A. or Senior N.C.O. dealing with radar equipment.

Housing accommodation will be provided within six months for the successful applicant, if married, and a lodging allowance will be payable whilst waiting for accommodation and living apart from family.

Written applications giving particulars of apprenticeship, training (including Forces training), qualifications and experience should be sent to the Industrial Recruitment Officer, A.E.R.E., Harwell, Didcot, Berks, quoting reference number IR/54(2). 6810

SENIOR ELECTRICAL ENGINEER

THE PLESSEY COMPANY at SWINDON wishes to appoint an Assistant to the Manager of Engineering and Sales of its ELECTRICAL CONNECTOR DIVISION.

A well-qualified electrical engineer is required, preferably with experience of the design and development of light and medium electrical connectors.

The appointment is a senior one and good personality is essential.

The remuneration will be generous and there is ample scope for advancement for the right man.

Those interested in pursuing this opportunity should write to :—

W. Chandler,
Manager of Engineering and Sales,
Connector Division,
The Plessey Company Limited,
Swindon, Wilts,

who will deal with applications personally and in complete confidence. 6703

AIR MINISTRY

STATION ENGINEERS (Boilerhouse) required for shift work at Sealand, Near Chester, Greenham Common, Berks and London Airport. Quals. required (a) apprenticeship of not less than 3 years as fitter; (b) technical education to O.N.C. (Mechanical) or equiv. standard; (c) experience in the operation and maintenance of boilerhouse plant (experience of high pressure water boilers or water tube steam raising boilers and chain grate stokers an advantage). Duties supervisory.

Commencing salary according to age, quals. and exp. on range £620-£780 per annum, Greenham Common and Sealand or £640-£805 London Airport, plus shift allowance of 6s. 6d. a shift. Lodging allowance payable in certain circumstances. Appointments non-pensionable. Normally only natural born British subjects.

Write giving age, full details of quals. and exp. to P.E.89, City of London Employment Exchange, Professional and Executive Register, 1-6, Tavistock Square, London, W.C.1. No original testimonials should be sent. Only candidates selected for interview will be advised. 256

W. T. GLOVER & CO. LTD.

Vacancies exist in our Rubber and Thermoplastic Cables Division for

YOUNG PHYSICISTS, ENGINEERS OR RUBBER/PLASTICS TECHNOLOGISTS

for product and process development work.

These posts offer great scope to the right men, with opportunities to move into other spheres of work in an expanding industry.

Please apply, stating age, experience, etc., to the Secretary, W. T. Glover & Co. Ltd., Trafford Park, Manchester, 17. 6833

BROOKHIRST SWITCHGEAR LTD.

invite applications for the following posts :—

DESIGN ENGINEER for work in connection with the design and development of units associated with motor control gear. Applicants must have a wide experience of the design of electromagnetic devices, an appreciation of modern production techniques, and an up-to-date knowledge of the availability and application to motor control gear of new developments in materials.

APPLICATION ENGINEER for the engineering of motor control schemes in connection with atomic energy power plants and other industrial applications.

These are senior posts and carry good salaries. The company have a contributory pension fund, and in certain cases it may be possible to transfer superannuation entitlements.

Please apply, stating age, experience and present salary, to :—

The Personnel Manager,
BROOKHIRST SWITCHGEAR LIMITED,
Chester

6813

ELECTRICAL ENGINEER

of degree standard required for development work on ignition apparatus, including coils and capacitors and of electronic equipment. Applicants should be not less than 25 years. Previous industrial experience desirable, preferably on development work. The duties are varied and interesting and provide very good opportunities for promotion. Staff pension fund.

Apply in writing, stating age, qualifications and experience, to the Personnel Manager, Joseph Lucas (Electrical) Limited, Great King Street, Birmingham, 19, quoting reference PM/D/162.

6829

SALES ENGINEER

YOUNG engineer required for outside technical sales staff in Midlands Area for sale of Power Factor Correction Capacitors.

Applicants should be keen, energetic and able to drive a car.

The successful applicant will receive brief training and have access to established contacts and every assistance from existing staff.

Reply:—

Sales Manager,
BRYCE ELECTRIC CONSTRUCTION CO. LTD.,
Kelvin Works, Hackbridge, Surrey.

6862

SOUTH WALES ELECTRICITY BOARD

ASSISTANT ENGINEER (Mains) required in District 223 (Swansea) in the West Central Sub-Area of the Board.

Salary Class F, Grade 10 (£740/£785) of the N.J.B. schedule.

Applications stating age, present position and salary, qualifications, experience and three referees should be addressed to the Secretary (Establishments Section) to arrive not later than 12th August, 1957.

R. G. WILLIAMS,
Secretary.

St. Mellons,
Cardiff. 6854

SOUTH WALES ELECTRICITY BOARD

ASSISTANT ENGINEER (Substations) required in District 222 (Neath) in the West Central Sub-Area of the Board.

Salary Class E, Grade 7 (£835/£880) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications, experience, and three referees, should be addressed to the Secretary (Establishments Section), to arrive not later than 2nd August, 1957.

R. G. WILLIAMS,
Secretary.

St. Mellons,
Cardiff. 6787

CENTRAL ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following position :—

THIRD ASSISTANT ENGINEER (Investigations),
TECHNICAL DEPARTMENT
(S/13.915).

The successful applicant will be responsible for the investigation of transmission and allied electrical problems. Experience with an electrical manufacturer would be an advantage.

Preference will be given to those who are members of a recognised professional institution.

Salary N.J.B. Class AX/CX, Grade 4, £895 to £1,080.

Special application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111, High Street, Portsmouth, should be returned by Wednesday, 7th August, 1957. 6844

SOUTH OF SCOTLAND ELECTRICITY BOARD

APPLICATIONS are invited for two positions as FOURTH ASSISTANT ENGINEERS in the Transmission Section of the Chief Engineer's Department. One position will be based at Galashiels and the other at Dunfermline.

Applicants should possess the minimum qualifications of a Higher National Certificate in Electrical Engineering and should have at least two years' experience of 132 kV lines and switchgear.

Salary N.J.B. Schedule B, Class AX/DX, Grade 5, £810/£1,010 per annum. The positions are superannuable.

Applications should be submitted to the undersigned, on the standard form, not later than Saturday, 3rd August, 1957, indicating preference for location and if interested in either position. Please quote reference No. E.35/57. 6855

CENTRAL ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following position:—

SECOND ASSISTANT STATION CHEMIST, PORTSMOUTH GENERATING STATION (S/13.935).

Applicants should have had practical experience of fuel, water and oil testing appropriate to a modern generating station and a knowledge of boiler chemistry for high steam pressures and temperatures will be an advantage. Preference will be given to candidates with H.N.C. in Chemistry or equivalent qualifications.

Salary N.J.B. Class G, Grade 11, £740-£785.

Special application forms obtainable from P. D. A. Oliver, Divisional Secretary, 111, High Street, Portsmouth, should be returned by 7th August, 1957. 6843

OLDHAM EDUCATION COMMITTEE

Municipal Technical College

APPLICATIONS are invited for the post of SENIOR LECTURER in Electrical Engineering to teach Higher National Certificate and I.E.E. Part III subjects. Candidates should have appropriate academic and professional qualifications, industrial and/or research experience, while teaching experience will be an advantage.

Salary in accordance with the Burnham (Further Education) scale, i.e. £1,350 × £50 to £1,550.

Further particulars and forms of application from the Director of Education, Education Offices, Union Street West, Oldham. 6859

INTERNAL SALES DEPARTMENT

VACANCIES exist for staff to handle composite contracts for all types of electrical rotating plant and associated equipment in the medium and large size classes.

Applicants with H.N.C. or O.N.C. preferred, but others with suitable experience would be considered.

Please write for application form, quoting reference "H.9," to

Personnel Manager,
METROPOLITAN-VICKERS ELECTRICAL CO. LTD.,
Trafford Park, Manchester, 17 6679

CENTRAL ELECTRICITY AUTHORITY

Midlands Division

A FOURTH ASSISTANT ENGINEER is required in the Telecommunications Section of the Technical Department. N.J.B. service conditions, superannuable appointment, salary within Schedule B, Grade 6, commencing in range £710 to £835, ultimately rising to £935 per annum.

Preference will be given to candidates who have had experience with telecommunications equipment, and the possession of a qualification equivalent to the Higher National Certificate in Electrical Engineering would be an advantage.

Apply, quoting Vacancy No. 602MD, on form AE6, available from the Establishments Officer, 53, Wake Green Rd., Moseley, Birmingham, 13, by 15th August, 1957. 6807

SOUTH WALES ELECTRICITY BOARD

THIRD ASSISTANT ENGINEER required in the Commercial Department of the Headquarters of the West Central Sub-Area of the Board at Fforestfach, Swansea.

Applicants must have had a wide experience in designing and quoting for all classes of installation work, including large industrial installations.

Salary Class L, Grade 10 (£995/£1,055) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications, experience, and three referees, should be addressed to the Secretary (Establishments Section), to arrive not later than 2nd August, 1957.

R. G. WILLIAMS,
Secretary.

St. Mellons,
Cardiff. 6775

ADMIRALTY

TRAINING OFFICER required to organise courses for Supervisors and Managers of Royal Dockyards and to lecture in management subjects, e.g., human relations, communications, chairmanship, etc. Considerable travelling at public expense will be involved.

Maximum salary, dependent on qualifications and experience, £1,500. Initially post is for three years subject to satisfactory service. No age limits.

Candidates must have had practical experience in organisation and presentation of training programmes for supervisory staff, preferably in engineering industry. Professional qualifications desirable.

Application forms can be obtained from Admiralty, C.E.II (114), Empire Hotel, Bath. 6776

NEWMAN INDUSTRIES LIMITED

in connection with their expansion programme in the manufacture of electric motors require a

DEPARTMENTAL MANAGER

to control one of their decentralised production units.

The work would comprise the supervision of production control, process planning, material control, work study and labour.

Only applicants who are engineers with experience of organising production will be considered.

Age preferred, 30-38 years.

Applications to :—

The Managing Director,
NEWMAN INDUSTRIES LIMITED,
Yate, Bristol

6828

CENTRAL ELECTRICITY AUTHORITY

Midlands Division

ASSISTANT ENGINEER (Operation and Efficiency) is required for Nechells "B" Power Station. N.J.B. service conditions, superannuable appointment, salary with Schedule A, Grade J8, £995-£1,055 per annum.

Applicants should have received a sound technical and practical training, and should have considerable experience in the operation and maintenance problems arising in a modern power station. The possession of a recognised technical qualification will be an advantage.

Apply, quoting vacancy number 606MD, on form AE6, available from the Establishments Officer 53, Wake Green Road, Moseley, Birmingham, 13, by 8th August, 1957. 6851

CENTRAL ELECTRICITY AUTHORITY

Midlands Division

GENERAL ASSISTANT ENGINEER is required at Nechells "B" Power Station for generation operational duties. N.J.B. service conditions, superannuable appointment, salary within Schedule A, J.14, £685-£730 per annum. An additional 10% of basic salary is payable when engaged on shift duties.

The appointment is permanent with excellent opportunities for advancement. It is necessary that applicants should have received a sound technical training and should preferably have had some industrial engineering experience and have as a minimum qualification the Ordinary National Certificate.

Apply, quoting vacancy number 601MD, on form AE6, available from the Establishments Officer, 53, Wake Green Rd., Moseley, Birmingham, 13, by 7th August, 1957. 6826

SOUTHERN ELECTRICITY BOARD

General Assistant Engineer

SUB-Area Engineering Department of No. 2 (Newbury) Sub-Area. Salary N.J.B. Class L, Grade 17 (£635-£680 per annum). N.J.B. conditions of service.

The duties of the post will be principally to assist with the installation and routine testing of metering equipments. An approved technical training and preferably some experience of similar work will be an advantage.

The successful candidate will be required to contribute to the C.E.A. and Area Boards (Staff) superannuation scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, and returned to him in envelopes suitably endorsed not later than 6th August, 1957. 6852

THE GENERAL ELECTRIC COMPANY LIMITED

have vacancies for

OPERATING ENGINEERS

for the Operational Service Department of the Turbine Division at Erith, Kent.

The duties involve dealing with a wide range of operating problems on turbo-alternators from 400 kW to 120,000 kW capacity and on blowers up to 100,000 c.f.m.

Minimum qualifications are H.N.C. and a sound experience of power station operation.

Apply giving age and details of experience to Personnel Manager (O.E.), The General Electric Company Limited, Fraser & Chalmers Engineering Works, Erith, Kent.

6832

MIDDLESEX COUNTY COUNCIL

ELECTRICAL ENGINEERING ASSISTANTS required in County Architect's Department. A.P.T. II (£639 17s. 6d. to £721 17s. 6d. if 26 years or over, plus £45 p.a. Westminster weighting) and A.P.T. III (£686-£814 2s. 6d. if 26 years or over, plus £35 p.a. Westminster weighting). Commencing salary according to qualifications and experience. Work comprises preparation of drawings, specifications and schemes for the wiring of buildings. Prescribed conditions.

Application forms (stamped addressed foolscap envelope) from County Architect, 1, Queen Anne's Gate Buildings, Dartmouth Street, London, S.W.1, returnable by 21st August (quote V.659E.R.). Canvassing disqualifies. 6857

A 12-MeV TANDEM ELECTROSTATIC GENERATOR

is now being built at

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL.

Applications are invited from Honours graduates with subsequent research experience (at least 3 years) and, preferably, knowledge of design of particle analysers or beta-ray spectrometers, to prepare suitable experimental instruments for new fields of study which will arise.

Salary £1,155-£1,355. Housing, superannuation and other excellent conditions.

Send POSTCARD by 3rd August, 1957, for further details and application form to :—

GROUP RECRUITMENT OFFICER
(837Z/48),
A.E.R.E., HARWELL, DIDCOT, BERKS.

6777

LONDON ELECTRICITY BOARD

Engineering Draughtsmen

APPLICATIONS are invited for the above posts in the Board's South Eastern District at Woolwich, S.E.18.

Applicants should have a good general and technical education, and also experience in layouts of substations and transformer chambers for voltages up to 11 kV, site plans and mains records.

The posts are graded under Schedule D of the National Joint Board Agreement as Grade 6, £635 to £755 per annum, inclusive of London allowance.

Application forms obtainable from Personnel Officer, 46, New Broad Street, London, E.C.2, to be returned completed by 3rd August, 1957. Please quote ref. PER/2274/R. 6758

TRINIDAD OILFIELD SERVICE LIMITED

Trinidad, B.W.I.

THE above company, who operate technical services to the oil industry, require for services for Trinidad, two engineers who must be Associate Members of either the Institution of Mechanical Engineers or Electrical Engineers. Graduates of the above institutions or those holding science degrees with sufficient practical experience will also be considered.

Salary, depending on qualifications, in the region of £100 per month plus allowances and home leave.

Please send full details to the company at P.O. Box 69, San Fernando, Trinidad, B.W.I., enclosing recent photograph. Interviews will be arranged in the U.K. approximately mid-September. 6780

CORPORATION OF THE CITY OF ABERDEEN

Lighting Department

APPLICATIONS are invited for the post of TECHNICAL ASSISTANT in the above Department at a salary within Grade C.S.6 (£565-£610). Particulars as to the appointment may be had from the Superintendent of Lighting, 262, King Street, Aberdeen, with whom applications should be lodged on or before 17th August, 1957.

J. C. RENNIE,
Town Clerk.

Town House,
Aberdeen.
3rd July, 1957. 9038

TECHNICAL PUBLICITY

ASSISTANT TO PUBLICITY MANAGER of manufacturing electrical engineers. The position should appeal to an intelligent young man with some electrical engineering background who wishes to make his career on the publicity and sales side of the industry. Advertising experience not very important, but some aptitude for this work obviously necessary. Salary according to initial and potential value.

Write to :—

Mr. T. J. Barfield,
LAURENCE, SCOTT & ELECTROMOTORS LIMITED,
Manfield House, Southampton Street, Strand, London, W.C.2 6811

BRADFORD INSTITUTE OF TECHNOLOGY

APPLICATIONS are invited for the appointment of SENIOR LECTURER in ELECTRICAL ENGINEERING in the College.

The salary scale, which is in accordance with the Burnham Technical Award, will be from £1,350 to £1,550 per annum.

Further particulars of the appointment and forms of application may be obtained from the Director of Education, Town Hall, Bradford. Completed forms should be returned to the Principal of the College as soon as possible.

A. SPALDING,
Director of Education.

6858

CLASSIFIED ADVERTISEMENTS ARE PREPAID

Situations Vacant (continued)

COUNTY BOROUGH OF HALIFAX

Electrical Engineering Assistant

APPLICATIONS are invited for the above appointment in the Borough Engineer's Department.

Salary within Special Grade (£707-£861 p.a.) according to qualifications and experience.

Applicants must be fully conversant in the design and preparation of drawings, specifications and estimates for electrical installations for all types of public buildings. Experience on education projects would be an advantage.

Applications stating age, qualifications, experience, etc., to be delivered to the Town Clerk, Town Hall, Halifax, by 6th August, 1957. 6804

CENTRAL ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 126/57

APPLICATIONS invited for superannuable N.J.B. appointment of ASSISTANT MAINTENANCE ENGINEER (Mechanical), NEWPORT POWER STATION.

Salary F.8, £835 × £15 to £880 per annum.

H.N.C. or equivalent qualifications and experience in power station mechanical maintenance desirable.

Application forms obtainable from Secretary, South Wales Division, Central Electricity Authority, Twyn-y-fedwen Rd., Gabalfa, Cardiff, to be returned by 7th August, 1957. 6805

CENTRAL ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 125/57

APPLICATIONS invited for superannuable N.J.B. appointment of STATION SHIFT CONTROL ENGINEER, USKMOUTH POWER STATION, Nr. Newport.

Salary K.10, £935 × £20 to £995 per annum.

Experience in modern generating station essential. H.N.C. or equivalent qualifications desirable.

Application forms obtainable from Secretary, South Wales Division, Central Electricity Authority, Twyn-y-fedwen Rd., Gabalfa, Cardiff, to be returned by 7th August, 1957. 6806

BRITISH KLOCKNER SWITCHGEAR LIMITED

Chertsey, Surrey

ESTIMATOR for TECHNICAL SALES. Correspondence and capable of preparing control schemes involving automatic motor control gear. Experience essential.

CIRCUIT DIAGRAM DRAUGHTSMAN. Preferably experienced in preparing automatic control gear schemes.

Applicants to have O.N.C. (Electrical). Excellent opportunities with fast growing concern. Pension scheme. Apply to Managing Director, stating experience and present salary. 165

SALES ENGINEERS

LAURENCE, SCOTT & ELECTROMOTORS Limited require SALES ENGINEERS for their Manchester Office.

Applicants should have received training with a manufacturer of rotating electrical machinery. They should be between 25 and 35 years of age and hold the Higher National Certificate or equivalent in electrical engineering.

Write in confidence, stating age, qualifications and experience to :—

Sales Director,
LAURENCE, SCOTT & ELECTROMOTORS LTD.
Openshaw, Manchester, 11 6779

APPLICATIONS are invited from electrical engineers aged 28 to 35, holding at least H.N.C., for a position in design office of specialist medium-size company 30 miles south of London. Salary £1,000 p.a. offered for at least 7 or 8 years' experience in designing wide range of H.V. and L.V. transformers. New housing available. Superannuation scheme. Apply in strictest confidence, giving full details of scholastic qualifications and technical experience, to—Box 6816.

A LARGE and progressive London company manufacturing electronic telephone and telecommunication equipment has vacancies for technical engineers and assistants with suitable qualifications and previous experience. Work will cover circuit design and laboratory testing of new switching development projects, using both standard and electronic methods, or the preparation of equipment layouts and exchange and contract specifications. B.Sc., H.N.C., or final C. and G. in telecom., all desirable, but main emphasis on experience. Salaries in the range of £450-£900 for assistants and £700-£1,100 for seniors according to age and qualifications. Excellent conditions and prospects. Assistance with removal and housing difficulties if necessary. We are looking for men of ability and invite you to write in confidence with full details to—Box 6767.

APPLICATIONS are invited from engineers of Higher National Certificate or Inter. B.Sc. standard for interesting investigational and development work on thermionic valves. Five-day week, pension scheme, staff canteen, modern welfare amenities. Apply, giving full particulars of age, qualifications, experience and present salary, to—Personnel Superintendent, Siemens Edison Swan Ltd., Cosmos Works, Brimsdown, Enfield, Middlesex. 6846

ARMATURE winders wanted for repair shop. Apply — Minta, Hartley Road, Luton. 9036

ASSISTANT electrical engineer required with knowledge of estimating for all types of contracts. Midland office. Full details with application to—Box 6834.

ASSISTANT engineer required by lighting equipment and transformer manufacturers in London. Ability to handle small staff. Good opportunities for advancement. Apply stating experience and salary required.—Box 9042.

B.B.C. requires engineer for wiring unit, planning and installation department, based London. Starting salary £1,060 rising by five annual increments to £1,365. Duties include planning, estimating and preparation of specifications for, and responsibility for subsequent execution of, the electrical wiring installations for various B.B.C. studio projects, including some of considerable magnitude. Applicants should have served full apprenticeship with recognised firm of electrical contractors and have had experience in all classes of installation work for lighting, heating and power. Application forms from Engineering Establishment Officer, Broadcasting House, London, W.1, quoting ref. E.719 E.R. 6817

CONNOLLYS (BLACKLEY) Ltd. require representative for their Cable Division to call on contractors and wholesalers, etc., in the Southern area — territory embracing L.E.B., S.E.B. and Eastern Electricity Board. Car provided. Superannuation scheme in operation. Applications giving full particulars and salary required will be treated in strictest confidence and should be addressed to the Sales Manager, Connollys (Blackley) Limited, Manchester, 9, marked "Confidential." 6792

CONNOLLYS (BLACKLEY) Ltd. require a representative for their Cable Division to call on electricity authorities, contractors and wholesalers, etc., in the North-East of England, preferably resident in the Newcastle area. Car provided. Superannuation scheme in operation. Applications giving full particulars and salary required will be treated in strictest confidence and should be addressed to the Sales Manager, Connollys (Blackley) Limited, Manchester, 9, marked "Confidential." 6791

CROMPTON PARKINSON Limited require a chief technical engineer at their Derby cable works. Applicants should be Corporate Members of the I.E.E. or equivalent and should possess an intimate knowledge of the design and manufacture of paper, rubber and thermoplastic insulated cables up to and including 33 kV. The position offers exceptional scope to the right man and provides excellent working conditions with superannuation fund facilities. Applicants should provide full details of past experience and qualifications, together with salary expected. Applicants should be addressed to the Director and General Manager, Derby Cables Ltd., Alfreton Road, Derby. 6818

DRAUGHTSMAN required for L.T. switchgear manufacturers in Westminster area. Splendid prospects for ambitious man. Write age, experience and salary required.—Box 6769.

DRAUGHTSMEN required in electrical drawing office of large steel works. Electrical experience desirable but not essential. Position gives valuable opportunity to applicants having varying degrees of experience. Apply—Labour Manager, Samuel Fox & Company Ltd., Stocksbridge Works, Nr. Sheffield. 6781

ELECTRIC lamp manufacturers require experienced all-round foreman capable of running modern automatic lamp-making unit and conversant with flame setting and mounting mill adjustment, etc. Good salary to the right man, excellent prospects and pension. Write—Ascot Lamps & Lighting Ltd., Arcola Street, London, E.8. 6864

ELECTRICAL. Company in London and Southern England invites applications from men with technical qualifications for post as electrical development technician to organise and control manufacture of domestic type electrical appliances. Applicants must have had previous experience of production methods and sound theoretical knowledge. Write stating fullest particulars, experience, qualifications, etc., to—Box 6793.

ELECTRICAL draughtsman required (Watford area). Must be able to work on own initiative from sketches and to prepare wiring diagrams, mainly concerned with electro-mechanical automatic control equipment, switch gear and thermostatic control systems.—Box 6783.

ELECTRICAL engineer required as branch manager (Manchester area) of established electrical contractors. Applicants should have sound knowledge of electrical contracting industry. Reply in strict confidence giving full details of experience and salary required to—Box 155.

ELECTRICAL fitter, preferably with knowledge of electronics, required for London national newspaper.—Box 6794.

FOREMAN required in maintenance department of the Leyland Paint & Varnish Co. Ltd., Northgate, Leyland, Lancs. Duties to comprise industrial power, lighting, heating and instrument installations and maintenance of all electrical equipment; supervisory post with pension scheme and other amenities. Applications giving particulars of training and qualifications to the above address. 6865

FOREMEN electricians required for long-term contract in India. Experience of cabling and lighting in modern steelworks essential, preferably with wiring contractors. Apply in confidence giving full details of experience, with references, to—Box 6871.

FULLY qualified electrical engineer (age 25-40) with degree or H.N.C. required to take control of laboratory investigating the characteristics and applications of ceramic bonded linear and voltage sensitive resistors. Experience in high-voltage transmission systems and testing procedure an advantage. Attractive opportunity of entering a large organisation with widespread interests through a small branch factory where personal abilities are quickly noticed. This appointment offers early prospects of promotion to the post of deputy technical manager to a suitable candidate. Position is permanent and pensionable and carries a salary commensurate with qualifications and experience. Applications giving detailed information to—The Personnel Officer, The Morgan Crucible Company Ltd., Woodbury Lane, Norton, near Worcester. 6795

INSPECTING engineer (electrical) required by consulting engineers to operate in the South of England from their Weybridge office. Applicants should preferably be between 25 and 35 years of age and should have had experience in the inspection and testing of electrical equipment with a bias towards control, instrumentation, protection and electronics. They must also possess graduate or prospective I.E.E. membership. Salary and prospects will be commensurate with the character of the appointment. Application forms should be applied for in writing to "Staff Appointments," Kennedy & Donkin, 813a, Wilmslow Road, Didsbury, Manchester, 20. 6796

INSTRUMENT panel wireman, also trainee, with some basic wiring experience, to work progressively under skilled supervision (Watford area).—Box 6782.

INSTRUMENT testers required for test room with experience in wiring, calibration and testing of electrical measuring instruments. These are staff appointments. Apply in writing to—Everett, Edgcumbe & Co. Ltd., Colindale Works, Hendon, London, N.W.9. 6689

MALAYA : Electrical engineer required for a group of tin mining companies. Applicants with A.M.I.E.E. or equivalent and good practical training only considered. Commencing salary according to training and experience, but would not be less than £1,400 p.a. plus provident fund and non-contributory pension scheme. Three-year contracts with six months' home leave on full pay. Write giving full particulars of age, education, training and experience and marital status to Box 465, Walter Skinner Ltd., 20, Copthall Avenue, London, E.C.2. 6819

OPPORTUNITY for keen man (about 30) to take charge of sales office of old-established firm in lighting industry. Experience in lighting fittings sales activities desirable but not essential. Applicants must have good knowledge of the electrical trade and be accustomed to dealing with users, contractors, architects, etc. Good prospects for keen organiser. 5-day week; pension fund. Write fully, stating age, experience and salary range.—Box 6690.

REPRESENTATIVE required by old-estd. electrical distributors for Hammersmith, London, area. Applicants residing and with connection in this area will receive preference. Car an advantage but intimate knowledge of trade is essential. Write stating full details of experience, with age, to—Box 6740.

SALES representative (age 25/30 years) with electrical engineering background required by old-established electrical engineering company in North-West London, to train as sales representative. Superannuation scheme. Write giving full details of age, experience and salary required to—Box 3MD.2783, A.K. Advg., 212a, Shaftesbury Ave., London, W.C.2. 6708

SAO PAULO LIGHT & POWER Company Limited, a British company in Brazil, invite applications from suitably qualified men for the position of shift charge engineer in the Piratininga Power Station. The power station was completed about three years ago and is situated near Sao Paulo (pop. 2.5 millions; temperate climate; 2,200 ft. above sea level). The plant comprised initially 2 80-MW, 1,800-r.p.m. steam turbo-alternator units, each supplied at 850 p.s.i., 900° F. by one 850,000-lb./hr. oil-fired boiler, and is now being expanded by the addition of two 125,000-kW reheat units, 1,800 p.s.i., 1,000° F. Applicants should have a sound technical knowledge and wide experience of the operation of modern turbines and boilers, preferably with oil or pulverised fuel firing; should also have an aptitude for supervision and the maintenance of harmonious labour relations. Good salary, three years' agreement subject to renewal with first-class passage both ways; four months' paid leave after three years' service. Written application in the first instance should be made to Mr. W. P. Kellett, Joint Manager, Canadian - Brazilian Services Ltd., 148, Leadenhall Street, London, E.C.3. 6820

SENIOR instrument engineer with H.N.C. or equivalent required for expanding instrument section. Knowledge of modern instrument practice essential, with experience of electronics, recorders and controllers of all types, and flame failure devices. The factory is situated in ideal country surroundings, 25 miles S.E. of Manchester and 6 miles N. of Buxton. There is a contributory pension scheme. Apply in writing, giving details of age, qualifications, experience and salary required, to the Personnel Manager, Ferodo Limited, Chapel-en-le-Frith, Via Stockport. 6724

SOUTH WALES SWITCHGEAR Ltd., Blackwood, Mon., require a design draughtsman for circuit breaker development and associated work. Application giving full particulars of education, experience and salary required to the Personnel Manager. 6797

TECHNICAL assistant required for small expanding firm of automatic control engineers. Experience of light electrical engineering as applied to this subject desirable. Good basic electrical engineering training necessary. Salary £800/£900 per annum.—Box 6784.

TECHNICAL assistant required with H.N.C. or Degree in Physics or Electrical Engineering, to deal with various aspects of development of power capacitors and the use of a surge-generator of 1½ m. volts. The post also provides a good opportunity for experience in the high-voltage field in connection with the testing of power transformers up to 15,000 kVA. Apply in writing in the first place to — Chief Engineer, Bryce Electric Construction Co. Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. 6669

TECHNICAL sales representatives for Greater London and Home Counties. Generous salary/commission/expenses. Must own car. Pension scheme, 5-day week. Only applicants with experience, initiative and dynamic personality will be considered. Full details to—Man. Dir., British Central Electrical Co. Ltd., 6, Rosebery Avenue, London, E.C.1. 6821

TRANSFORMER designer (senior) required. Applicant must have wide experience in design and manufacture of units up to 250 kVA. Promotion to directorship offered after qualifying period with commensurate salary and bonus. Housing accommodation if required. Replies will be treated in strict confidence.—Stewart Transformers Ltd., 75, Kilburn Lane, London, W.10. 6866

TWO stores assistants required by progressvie London wholesaler. Good knowledge of trade desirable. Good prospects; non-contributory pension scheme. Apply in writing to—The National Electrical Supplies Co. Ltd., 240/244, King Street, Hammersmith, London, W.6. 6835

WAREHOUSE assistant packer wanted by electric lamp distributors. Good wages, five days. Write fully with references, etc.—Box 6867.

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ELECTRICAL engineer, just returned from 4 years overseas, experienced contracting, estimating, installations, overhead lines, underground cables, motor repairs, requires supervisory position home or overseas.—Box 9048.

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Isolator. Triple-pole air-break, locks in "on" and "off" position. Ammeter mounted.

Necessary cable boxes attached, the whole suitable for wall or pillar mounting. In operation 6 months and in good condition.

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kVA	r.p.m.	kVA	r.p.m.
3200	214	900	300
1500	750	800	1000
1200	750	650	500

and smaller

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1,600-kW, 500-r.p.m. Synchronous Motor, max. 6,500 volts/440-500 volts D.C. (Two sets available.)

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THREE-PHASE MOTORS

h.p.	r.p.m.	h.p.	r.p.m.
2450	211	800	230
1200	245 (3)	600	224
1150	494	550	245

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D.C. MACHINES

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DIESEL-GENERATOR SETS

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mm.	mm.	Per 1,000
200,000	3.5 diam. × 0.8 thick	£2 18s.
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Prices F.O.B.

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ALBERICE METER COMPANY
Fairfax Works, Fairfax Rd., London, N.8
(Tel. MOUntview 7944, 6373) 191

A BABCOCK & Wilcox water tube boiler will cut down your fuel costs; we can supply from stock. Two 40,000 lb. evap., 220 lb. w.p.; one 25,000 lb. evap., 200 lb. w.p.; 3,000 lb. evap., 400 lb. w.p.; Spencer Bonecourt boiler; also Marine, Cornish vertical, etc.—Burford, Taylor & Co., Ltd., Boiler Specialists, Burtayco House, Church Street, Middlesbrough (Tel. Middlesbrough 2622). 122

A NUMBER of secondhand electric motors offered for sale including 15-h.p. E.C.C., 30-h.p. B.T.H. with contactor starter, 2 28-h.p. E.C.C. (one with pony starter) and Brookhirst switchgear starters, 1 27½-h.p. Crompton Parkinson slipring motor with Allen West starter and ½-h.p. A.C. motor. All 3-phase, 400/440. Available for inspection. Offers invited for single motors or offer for the whole to clear. Apply—J. Alsford Ltd., Twickenham Road, Hanworth, Feltham, Middx. 164

A.C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. (Edgware 5566/9). 91

A.C. and D.C. 1/- Slotmeters. Guaranteed 2 years, 2½-50 amps. From 50/- Repairs and recalibrations. See Billiard: Tradex Meter Co., Surbiton (Tel. Elmbridge 4487). 169

ALTERNATORS from ½ to 675kVA in stock, single and three-phase, all voltages and frequencies. Guaranteed. Many unused. Send your requirements.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 162

ALTERNATORS, generators, 1-100 kVA, all voltages. Specialists—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 147

ALTERNATORS, 3-phase, all sizes in stock from 7 kVA up to 330 kVA.—Britannia Manufacturing Co. Ltd., 20/26, Britannia Walk, London, N.1 (CLErkenwell 5512). 24

AUTO transformers, quantity for disposal, 60 w., 120 w. and 500 w. If interested write—Box 6868.

BARGAINS in electric motors are always being obtained from A. Cooksley & Co. Ltd., 21/25, Tabernacle Street, London, E.C.2. Stocks include A.C. and D.C. motors, secondhand and new up to 30 h.p. Starters, slide rails and pulleys. Ring. Mon. 3355 for your requirements. 50

BILLIARD Meters. 1/-, 6d. or 1d. slot. All time settings. From 140/-. See Quarterly.—Tradex, Surbiton. 170

BRUCE Peebles frequency changer set. Input 400 volt, 3-phase, 50 cycles; output 500 volts, 3-phase, 125 cycles, 229 kVA, complete with control gear.—Whitefield Machinery & Plant Limited, Cobden Street, Salford, 6 (Tel. Pen. 4746). 302

CABLE, underground, all types ex stock.—E. M. Tatton Co. Ltd., Kew Bridge, Brentford (Ealing 3155/6). 117

CABLE, underground, PILC/VIR/LC, ex London stock. Cutting orders same day delivery London area. Send for priced stock lists.—Batt Electrical Co., 6, Dock Street, London, E.1 (Tel. ROYal 5905). 316

CIRCUIT breakers, various sizes in stock, A.C. and D.C., 200 amperes up to 2,000 amperes. Also dynamo and alternator switchboards.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 26

CONVERTERS, 110 and 220 v. D.C./230 v. A.C., .5 to 6 kVA; also A.C./D.C. Special voltages at short notice.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 150

CRANE motors. Direct current, series wound or compound wound, all voltages. We have large stocks.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 22

DIESEL generating sets, all sizes to 500 kW. Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 16

ELECTRIC motors, dynamos, alternators and motor generator sets of all sizes. We hold one of the largest stocks in England. New and reconditioned, with 12 months' guarantee.—Britannia Manufacturing Co. Ltd., Britannia Walk, London, N.1 (Clerkenwell 5512, 3 lines); also Works and Stores, Chobham, Surrey. 20

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ELECTRIC motors, generators, motor generator sets, transformers, switchgear, etc., large comprehensive stock, overhauled and guaranteed. Copy of our Register, "Electrical Surplus," containing thousands of items of electrical plant, sent on request.—R. F. Winder Ltd., Belgrave Electrical Works, Leeds, 2. 54

ELECTRICIANS. Send for details Shaftesbury lightweight "Bantam" ladders. Top sections fitted with patent moulded rubber blocks, eliminate possibility of scratching or marking walls, fascias, and other painted or highly polished surfaces. Also available for immediate delivery, steps, platform steps, trestles, telescopic trestles, pole and builders-type ladders, and all sizes of two and three-section extension ladders.—Shaftesbury Ladders Ltd. (E.R.), 453, Katherine Road, London, E.7 (Phone: Grangewood 3363/4). 111

FANS, desk and ceiling type, D.C., all voltages and sizes in stock. — Universal Electrical, 221, City Road, London, E.C.1. 6837

FLUORESCENT fittings, lamps, starters and control gear for home and export. Fully guaranteed by actual manufacturers. Send for catalogues.—The Anglo-American Electrical Company, Olive Street, Bury, Lancs. 245

FLUORESCENT tubes reconditioned and guaranteed as new for 7s. 6d. each. Free collection and delivery in Lancs and Yorks.—The Anglo-American Electrical Company, Bury New Road, Breightmet, Bolton, Lancs. (Telephone, Bolton 7251). 212

FOR sale, 2 sets 30-kVA transformers, control panels, rotary rectifiers for converting 400/3/50 to 60,000 volts D.C.—Capper Pass & Son Ltd., Melton Works, North Ferriby, Yorks. 6800

GENERATING plants, remote and M/F up to 10 kVA; also secondhand A.C. and D.C. sets up to 100 kVA, large stock all types. Special plants built at short notice.—Powerco Ltd., 312, York Rd., London, S.W.18 (Tel. VAN. 5234). 151

GENERATING sets for sale, petrol, diesel and steam, from 1 kW up to 700 kW. A.C. and D.C. switchboards.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 161

HOUSE service meters, C. & H., Aron, E.A.C., 20-240 v. A.C., s.-ph., 50 c., 2½ amps., 7s. 6d. each, 1s. 6d. postage; 5 amps., 17s. 6d.—Universal Electrical, 217-221, City Road, London, E.C.1. 37

LANCASHIRE motor generator sets. One 500 kW, output 400/200 volts D.C., 3-wire, 985 r.p.m. One 100 kW, similar, 1,470 r.p.m. Motors at present 400 volts, single-phase, 50 cycles, can be re-designed for 400 volts, 3-phase, 50 cycles. Static balancers and Brookhirst switchgear available. Ball and roller bearings throughout. Flexible couplings. Further details and photographs from Dynamo & Motor Repairs Ltd., North End Road, Wembley Park (Tel. Wembley 3121). 6711

McLAREN-Ricardo diesel generator set, 31 kVA Met.-Vickers, 400/230 A.C., £150.—Harling, 140a, Lower Marsh, London, S.E.1 (WATerloo 4781). 9053

MOTOR generator sets and converters, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Tel. Clerkenwell 5512, 5513 & 5514). 12

MOTORS, starters, circuit breakers. Large stock of all types, ½ to 300 h.p., new or reconditioned, for immediate delivery. Stock list or quot'n by return.—J. S. Ramsbottom & Co. Ltd., Elec. Engs., Keighley (3774/5/6). 70

MULTI-winding machine complete and in full working order, recently overhauled by the Leesona Company's engineer. Original cost over £1,200. Must sell, space urgently required. Bargain £575.—Box 6801.

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OFFERS invited, one 70-kW electrode boiler, by Bastian & Allen, complete with all switchgear, pumps, etc. Perfect condition. Engineer's report, can be seen working. Apply—Cave, Jacksonhill Farm, Queensbury, Near Bradford. 9056

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PLATING dynamos and motor generator sets, various sizes from 500 amps. up to 2,000 amps., with A.C. or D.C. motors.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 15

POLYPHASE kilowatt hour meters. Available from stock.—Universal Electrical, 221, City Road, London, E.C.1. 40

PREPAYMENT 1s. slot house service meters. —Universal Electrical, 217-221, City Road, London, E.C.1. 36

PURLEY chokes and ballasts. Our 80-w. tapped h.p.f. ballast with starter switch-holder incorporated is proving itself the most popular unit. Suitable for most fittings. 57s. 6d. each subject.—F. W. Blanshard Ltd. (Dept. ER), Purley, Surrey (Uplands 4818/9). 52

QUARTERLY Credit Meters, single & poly-phase, 2½-100 amps. From 17/6d. Also D.C. See Television.—Tradex, Surbiton. 171

ROTARY converters in stock, all sizes: enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 34

ROYCE industrial type electric drying ovens, 77" × 60" × 52", with air circulating fan and thermostat, 160° F. New.—Richard Wilson, Bradford Road, Stanningley (Tel. Pudsey 4291). 6696

SMALL BA screws and nuts in steel, brass and stainless steel, from stock.—Premier Screws & Repetition Co. Ltd., Woodgate, Leicester. 180

TELEVISION slotmeters & Time Switches. Details from: Tradex Meter Co., Surbiton. Elmbridge 4487. 172

VENNER time switches, 200-240 v. A.C./D.C., 10-50 amps., from stock.—Universal Electrical Co., 221, City Rd., London, E.C.1. 38

WARD Leonard motor generator sets, all sizes.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1 (Tel. Clerkenwell 5512). 10

400-cycle to 1,500-cycle motor alternators and alternators.—Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 27

1,000 new storage cells for sale, heavy duty, 570 amps., ebonite container and sealed covers. Orig. made for Admiralty, packed 4 per wood case for transit. Low price for quantities.—Burleigh Alpine Works, Empire Way, Wembley (Tel. 0211). 324

10,000 bakelised paper tubes, 1" i/d., 1.1/16" o/d., 15" long. Offers, any quantity supplied.—Castleman, Alton, Staffs. (Phone, Oakamoor 238). 9055

EQUIPMENT FOR HIRE

GENERATING set hire service. Consult the most experienced firm for A.C. and D.C. units from 2 kW to 240 kW diesel or petrol. stationary or mobile, sale or hire. 24-hr. breakdown service.—Dawson-Keith Ltd., Hillview Rd., Sutton, Surrey (Fairlands 4401). 46

RELIABLE, self-contained diesel electric generating sets for hire, 2.5 to 260 kW. Night and day maintenance service. Quotations by return.—Whitetrade Limited, Rochester, Kent (Tel. Chatham 4638/9). 294

ARTICLES WANTED

HARRINGTON & SONS, reclamation contractors, want redundant A.C./D.C. electric motors and transformers, stocks of cable, etc. — 109, Beaconsfield Street, New Beckton, East Ham, London, E.6 (ALB. 1388). 315

MERCURY (Quicksilver) wanted. Write for packing instructions. Gold, silver and platinum also purchased.—Collingridge & Co. Ltd., Riverside Works, Riverside Rd., Watford (Tel. 5963). 114

READY money for redundant electrical equipment. Complete works bought outright for expert and rapid dismantling.—F. C. Larkinson Ltd. (Est. 1880), Hitchin Street, Biggleswade, Beds. (Tel. 2391) (12 branches throughout the country). 281

SURPLUS laminations, enamel copper wire, screws, nuts, flex. Good prices paid. Full details to—Box 199.

SURPLUS stocks of all types for domestic electric appliances wanted for prompt cash. Large funds available.—Spears, 14, Watling St., Shudehill, Manchester (Phone, Blackfriars 1916) (Bankers, Midland Bank Ltd.). 8818

WANTED, D.C. and A.C. ball-bearing motors, motor generator sets, dynamos and alternators. Full details to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 13

WANTED, rotary converters, any sizes.—Universal, 221 City Rd., London E.C.1. 35

WANTED for prompt cash, ferrous and non-ferrous scrap, also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. & H. Cooper Ltd., 176, Brady St., Bethnal Green, London, E.1. 120

WANTED, quantity alternators, 40-100 kVA, single or three-phase, any speed from 600 r.p.m. upwards. Burnt-out machines acceptable providing mechanically sound.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 6869

WANTED, surplus stock cable, all types and sizes. We can inspect.—Box 220.

150-h.p., 970-r.p.m. slipring motor, 400 v., 3-phase, 50 cycles, with starting gear. L.D.C. or C.P. with Ellison gear preferred. Also two 5-h.p., 960-r.p.m., 230-volt D.C., totally enclosed, fan-cooled or dustproof motors. Details to—Dynamo & Motor Repairs Ltd., North End Road, Wembley Park. 6712

WORK WANTED AND OFFERED

A.C. and D.C. motor rewinds and repairs. Prompt service, fully guaranteed.—Edgware 5566/9; Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. 92

DRAWING office work of all types undertaken. London area.—Phone, Hayes 6627. 9052

PRODUCTION sheet metal capacity available by company with stove enamelling and electrical assembly facilities, i.e., fluorescent fittings, electric fires, etc.—Box 6576.

SMALL armature, stator, transformer and general coil winding undertaken on production run.—Kensal Electrics Ltd., 151, Kensal Rd., London, W.10 (LAD. 4530). 202

TRANSFERS and display cards made to customers' requirements at competitive prices. — Ashfield Screen Printing Ltd., Borrowash, Derby. 9045

AGENCIES

AGENTS wanted for attractive range of wrought iron decorative lighting fittings in contemporary finish.—Box 6803.

ELECTRICAL engineer with office and storage space in London would take representation of firm. Moderate terms.—Box 9047.

EXCLUSIVE agency Midlands area. Commission representative required by manufacturers of automatic electrical control equipment.—Box 6774.

SCOTLAND and N.E. England. Cable clips and conduit accessories. Commission agents wanted for both areas with good wholesale and shipyard connections.—Box 6802.

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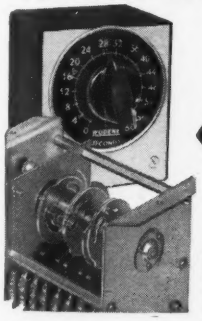

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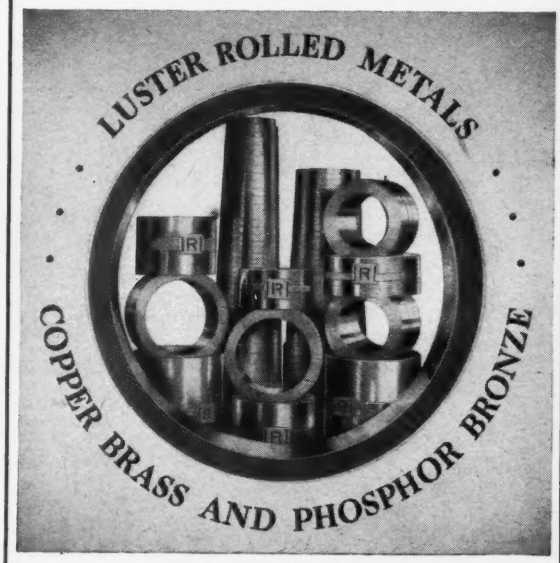

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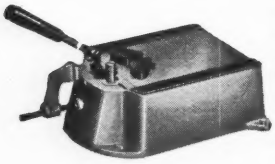

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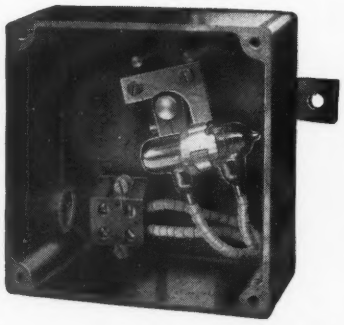

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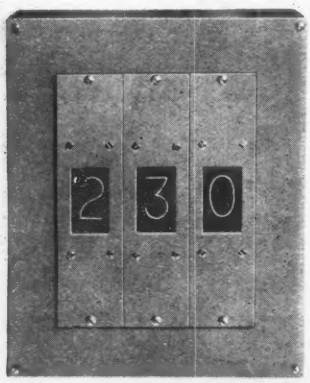

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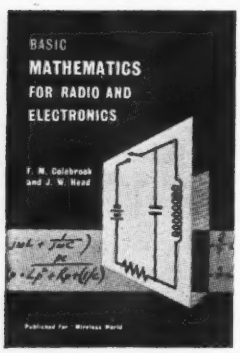

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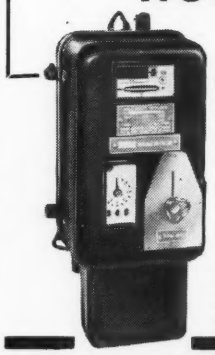

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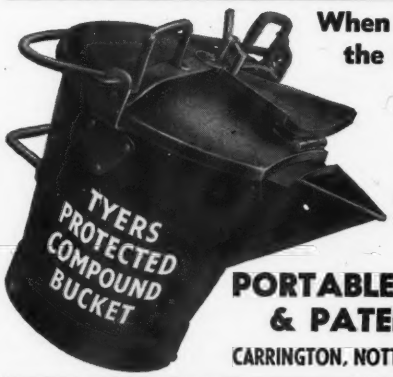

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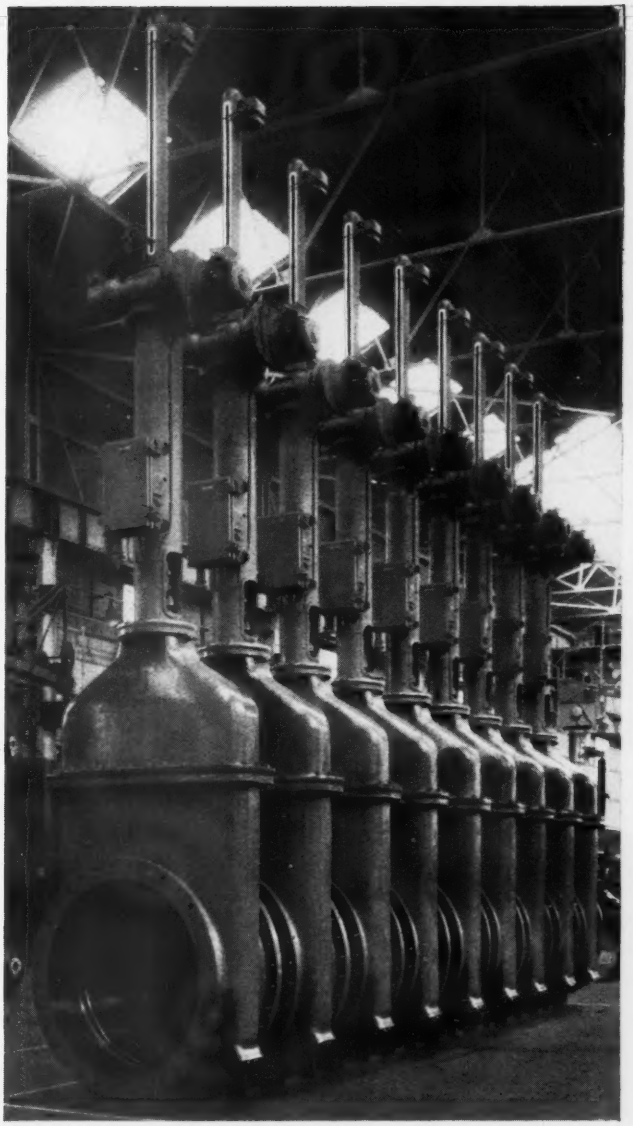

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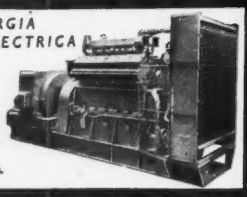

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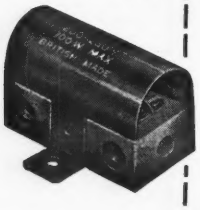

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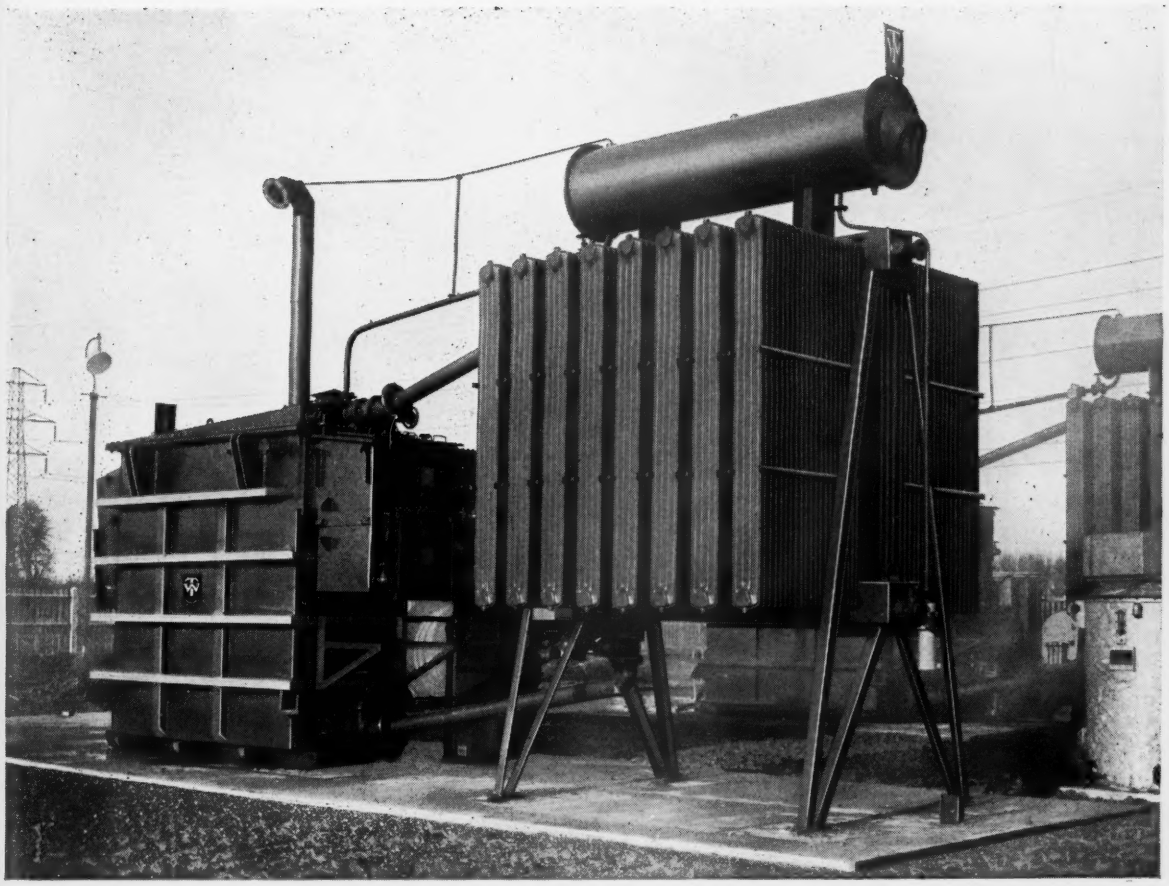

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